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Renate Musan, Monika Rathert (Eds.)

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Tense across Languages

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Renate Musan & Monika Rathert

Tense across Languages – an Introduction

1. Introduction

Tense is a well-studied issue in linguistics. Nevertheless, it tackles on so manifold issues, dimensions of language, and phenomena that every now and then a fresh look at it is advisable. The present volume aims at providing such a new look by illuminating the field from different perspectives, across languages as well as across phenomena.

According to traditional grammars, tense relates the situation described in a clause with respect to the time of speech. Reichenbach (1947) showed that this view is too simple; in his account tense constructions relate three times to each other: the time of speech (S), the time of the event (E), and the reference time (R), i.e. the time from which the clause situation is looked at. The English simple past, for instance, is analyzed as follows: R is located before S, and E ist located at R. And in the past perfect, E and R differ: R is before S, and E is before R. In Reichenbach's tense theory, the third crucial time, the reference time, was thus part of the tense semantics.

This being a widespread view of tense, there is also a common notion of aspect: Aspect is a grammaticalized verbal category that refers to the internal temporal structure of situations. Roughly speaking, perfective aspect looks at a (completed) situation in its totality where its internal temporal structure is not analyzed. Imperfective aspect looks at a situation as consisting of phases, e.g. a beginning phase or an end phase. The English progressive (or continuous) form expresses a subtype of imperfective aspect; it expresses the progress of a situation relative to a certain point in time.

Later versions of three-time-theories modified the view of Reichenbach on tense. Thus, Klein (1992, 1994) related three times to each other but integrated aspect into this system, or – to view it from another angle – split up the functions of the three times between tense and aspect. According to him, tense relates the topic time (very roughly corresponding to Reichenbach's reference time), i.e. the time the speaker talks about, with regard to the time of speech, but aspect relates the time of the clause situation with regard to the topic time. Applied to the English simple past and past perfect, this amounts to the following: the simple past tense locates the topic time of its clause before the time of speech, while the perfective aspect, which is associated with the simple form, locates the situation time at the topic time. Similarly, because of the past component, the past perfect also locates the topic time before the time of speech, but the perfect aspect locates the situation time before the topic time. Hence, the situation time of the clause is not directly located by tense but indirectly. It is thus not surprising that tense is often not looked at alone but together with aspect.

Another category that plays an important role in the context of tense interpretation is modality. Modal expressions indicate the attidude of the speaker towards the proposition. Modality occurs in different flavours (deontic, epistemic, among others). Deontic interpretations of modals (expressing notions like duty or obligation) evaluate a proposition according to some moral code. Epistemic interpretations of modals comment on the degree to which the speaker is committed to the truth of the proposition. Modality is expressed with different linguistic means, one of them being modal auxiliaries, another being verbal inflection, i.e. mood. Both modal auxiliaries and mood interact with tense, and some linguistic devices carry both modal and temporal meaning components.

Hence, tense, aspect, and modality – and especially mood – are often described as complexes of relations that hinge together in one way or another. Some branches of the relevant literature treat the interaction of tense and aspect (Hopper (1982), Comrie (1985), Bybee and Dahl (1989), Dahl (2000), and others); some deal with the interaction of tense and modality (cf. Diewald (1993), Abraham (2008), among others); and some describe the whole tense-aspect-mood or TAM systems of languages as interrelated systems (cf. Abraham and Janssen (1989), Bybee, Perkins, and Pagliuca (1994), among others).

2. Tense and Modality

As is widely known, modal verbs are polyfunctional in the sense that they express both tense and modality (e.g., *He will leave* expresses both a future event (tense) and the probability of this event (epistemic modality)). The semantic theory of modals has been strongly influenced by Kratzer (1991); according to her, modals introduce alternative worlds which are evaluated against a conversational background (modal base). In this volume, three papers deal with the issues of tense and modality.

In her paper “Tense and Volitionality”, **Eva Remberger** analyzes several kinds of shift phenomena related to tense in general and to the time-relational organisation of volitional modal constructions with the modal verb *want* and its equivalents in other languages, abbreviated WANT, in particular. Among the modal verbs, WANT, the verb encoding volitionality, has often been shown to be an exception for several reasons, depending on the morphosyntactic and semantic properties of the language at issue. WANT shows a so called future shift, i.e. it undergoes a grammaticalization process towards a future auxiliary, which is found in languages like Romanian, Greek and also English. WANT also shows an evidential shift; restricted to German, this shift consists of an evidential interpretation of WANT in certain time-relational configurations. Remberger analyzes both shifts by adopting a compositional semantic analysis that takes a biclausal structure with two temporal relations for each clause as the basic template for all types of modal constructions.

Magdalena Schwager analyzes in her paper “Imperatives and tense” the temporal properties of imperatives. Schwager argued already in her dissertation (Schwager (2006)) for a semantic analysis of imperatives in terms of a modal operator ImpMod, in a Kratzer-style modal semantics. In this paper, she demonstrates that the modal analysis of imperatives helps to account for tense in imperatives. The covert imperative modal is in complementary distribution with overt modals and has a performative interpretation. As a consequence of this performative interpretation, imperatives lack a truth value. Schwager shows that, contrary to the common opinion, imperatives are not restricted to future reference. In present tense imperatives, the event time is only required not to be properly past. German and English keep this requirement, even if the tense time is shifted by a speech report. In contrast, Dutch counterfactual imperatives require precedence with respect to the shifted tense time. Schwager also discusses present perfect imperatives in German that are used to express wishes.

Anastasia Giannakidou's paper "(Non)veridicality and mood choice: subjunctive, polarity, and time" investigates the lexical parameters determining the choice of subjunctive in Greek. Giannakidou shows that the Greek subjunctive involves two syntactic positions: one is the position of the verb form, where a perfective non-past (PNP) appears; the other is a higher particle *na* which is generated as a mood head. She examines the distribution of *na*+PNP in complement clauses, adjunct clauses, and uses of it under negation and in relative clauses (known as "polarity" subjunctives). Most importantly, she shows that there is a correlation between polarity item licensing and subjunctive clauses in Greek, suggesting that the same property is regulating both. Building on earlier work (Giannakidou (1998), Giannakidou (1999)), she proposes that this property is nonveridicality: verbs selecting the indicative are veridical, and those selecting the subjunctive are nonveridical.

3. Understudied Tense Phenomena and Typological Variation

The three categories tense, aspect, and mood are realized differently in the languages of the world. In languages like English or German, tense is realized morphosyntactically in the verb complex. In languages like English, but not German, aspect is realized morphologically on the verb, too. Mood on the other hand is clearly realized on the verb in German. Other languages, like Chinese, do not even realize tense on the verb. Moreover, individual languages mark different tense relations while leaving out others.

From the point of view of language typology, the most common tenses that are overtly expressed are *past, future,* and *perfect* (cf. Dahl (1985), Bybee and Dahl (1989)). In the majority of cases, the present tense is morphologically unmarked. Often, tense combines with aspect; the most common kinds of aspect are *progressive, imperfective, perfective*. Tense may be expressed either by periphrastic or by inflectional expressions. Typologically, *perfect* and *progressive* have a very strong tendency for periphrastic expressions, while *past, imperfective* and *perfective* prefer the inflectional variant. *Future* does not show such a preference.

While certain languages, especially many European languages, are well studied, other languages are notoriously understudied. This leads to a biased picture, and therefore, it is important to have a look at the understudied languages, and especially on their expression of tense. In this volume, this is done by Chen, who looks at the Austronesian language Rukai, and by Landgraf, who studies Scottish Gaelic.

Cheng-Fu Chen analyzes the future of a less studied language in "Use and temporal interpretation of the Rukai future tense". Rukai is an Austronesian language spoken in the southern and southeastern parts of Taiwan, which include Kaohsiung, Pingtung and Taitung

Counties. The Rukai tribe consists of three branches with altogether six dialects. Chen investigates the Budai Rukai dialect. It is shown that what appears to be the Rukai future tense morpheme at first sight conveys an intrinsic temporal relation of posteriority that involves a given reference time. In subordinate or embedded constructions, as the reference time may or may not be anchored to the speech time, the morpheme behaves like a relative tense in the sense of Enç (1987). By investigating the readings of sentences containing this morpheme as well as modal morphemes expressing necessity or possibility, Chen argues for a compositional analysis of the morphosemantic interaction between the future tense and modals. In particular, Rukai expresses future tense (or rather posteriority) and modality morphosyntactically independently of each other.

Jule Landgraf's paper "Tense in the Scottish Gaelic Verbal System" describes tense in Scottish Gaelic. She investigates the morphology and semantics of tense and aspect in this language, and she shows that there are three main verb forms in Scottish Gaelic: the so-called independent, dependent, and relative form. The dependent form is chosen when particles expressing certain sentence types (e.g. negated or interrogative sentence types) are present. Hence, they may be viewed as supporting somewhat redundantly the expression of these sentence types. Surprisingly, in most cases it is the distinction between dependence and independence that is marked morphologically on the verb rather than tense. These forms interact with the syntactic context in order to indicate the temporal interpretation. Scottish Gaelic lacks a simple present tense. Instead, two other tenses are used to express present time reference: a present progressive and a future tense, which interestingly is also being used with a (mostly habitual or historic) present time reference.

Michael Rödel's paper "New perspectives on double perfect constructions in German" deals with a special construction in German, and although German is of course not understudied, the phenomenon at issue in Rödel's article, the so-called double perfect and double pluperfect form, is. Rödel shows that these forms escape a proper compositional temporal analysis. Instead, aspect plays an important role. The analysis builds on previous work of the author (Rödel (2007)). Although many speakers of German believe that double perfect constructions are substandard, they occur frequently and in all registers; Litvinov & Radčenko (1998) have shown that they are even attested in literary classics. Contrary to common opinion, double perfect constructions are not characteristic of a special upper German dialect, they exist in all areas of Germany; there is even evidence for double perfects in the history of lower German.

4. Tense in Tenseless Languages and Sequence-of-tense Phenomena

Although time is a universal dimension of the human experience and speaking is part of that experience, some languages encode reference to time without any grammatical tense morphology of the verb. In this case, the language will provide other means to express the same relations. In languages like German or English, for instance, adverbials support the verb morphology by expressing more specific time relations. Other languages do not make use of verb morphology at all in order to express tense. Chinese, for instance, uses particles for expressing tense relations. Other languages mark time relations on nominals. Further languages do not mark tense relations morphosyntactically at all but express time relations only lexically. Some of the exceptional 'tenseless' languages are investigated in this volume by Bittner, Haude, and Tonhauser.

Maria Bittner in her paper "Time and modality without tenses or modals" investigates fascinating questions at the bottom-line of cross-linguistic semantics: what are semantic universals? With regard to which parts of semantics do languages resemble each other and which parts are subject to cross-linguistic variation? The paper focusses on two typologically divergent languages: English, which grammatically marks verbs for tense, and the tenseless language Kalaallisut, spoken in Greenland, that marks verbs rather for illocutionary mood. She claims that structurally, both grammatical systems work very similarly in that they both exploit a centering system to express temporal and mood relations respectively. Furthermore, the author claims that though Kalaallisut does not have grammaticalized tense, it can use mood to express basically the same temporal relations that can be expressed in English using grammaticalized tense. To support this assumption the paper presents a fully worked out formal compositional semantics for the relevant constructions in English and Kalaallisut.

Katharina Haude's paper "Tense marking on dependent nominals in Movima" analyzes the tense system of the Bolivian language isolate Movima, which is shown to be an instance of what is called "nominal tense marking" by Nordlinger and Sadler (2004). Instead of being marked on the verb, semantic distinctions which might roughly be characterised as non-past, recent past, and past are each expressed by a particular deictic form of the prenominal article, referred to as "presential", "absential", and "past", respectively. Haude convincingly argues that the tense-marking function of the article has gone beyond the indication of location and existence of the nominal referent, in that it specifies the relation between event time and time of speaking. The potential of indicating propositional tense directly constitutes the final stage in a proposed shift scenario from independent to propositional tense. The paper concludes with reflections on the extent to which the system of Movima matches the defining criteria of the notion of grammatical tense.

Judith Tonhauser explores another language without grammaticalized tense, Guaraní. Her paper "The Paraguayan Guaraní future marker *-ta*: Formal semantics and cross linguistic comparison" contributes to the cross-linguistic study of future markers by exploring the truth conditional semantics of *-ta*. This suffix is the marker most commonly used by consultants asked to translate Spanish sentences with future time reference. Tonhauser argues that *-ta* is a future marker that entails future time reference in present and past contexts and is compatible with the modal meanings of intention and prediction. The formal semantic analysis is shown to account for a counterfactual interpretation that arises when *-ta* co-occurs with certain past time adverbs. The paper also compares *-ta* to other future markers that convey intentions and predictions, in particular English *will/would* and *kelh* of the Salish language St'át'imcets, spoken in British Columbia, Canada.

Whereas the above papers present tenselessness as missing verbal inflection, there is still another kind of tenselessness – zero-tenses. Zero-tenses are tenses that occur overtly, e.g. as inflectional morphemes, but do not locate the situation or the topic time of the clause in time. That is, their semantic contribution to the clause is zero. This plays a role in sequence-of-tense (SOT) phenomena, which occur in attitude-complements. The interpretation of temporal expressions in embedded contexts is a complex issue, there are contrasts between temporal expressions in the scope of attitude verbs and those in adjunct clauses, and there is significant cross-linguistic variation (Kusumoto (1999), Ogihara (1996)).

Hamida Demirdache and Oana Lungu's paper "Zero-tense vs. indexical contruals of the present in French L1" treats a tenseless present in French child language. It is known that Japanese has both an indexical present and a tenseless or zero present (Ogihara (1999)). Demirdache and Lungu's experiments with child French show that French children also have these two presents, just like Japanese adults, but unlike French adults. These surprising findings are explained by a scopal analysis of tense in relative clauses together with the observation that children show a strong bias for surface scope (isomorphic) interpretations.

5. A Note about the Volume

The ten papers in this volume are organized in three sections, depending on the most central issues they tackle on, "Tense, mood, and modality", "Understudied tense phenomena and typological variation", and "Tense in tenseless languages and sequence of tense phenomena". They are updated versions of talks presented at the workshop "Tense across Languages" that we organized together with Rolf Thieroff during the annual meeting of the Deutsche Gesellschaft für Sprachwissenschaft (DGfS) at Bamberg University, Germany, in February 2008. It was an enormous pleasure for both of us to prepare this volume. We would like to thank our authors for their contributions; we benefited enormously from reading their chapters. Many thanks also to our reviewers, who did a great job, and to Carolin Eisfeld, Nadja Hekal, Juliane Mroz, and Waldfried Premper for further corrections. We would like to thank Elisabeth Stark for including this volume in the series "Linguistische Arbeiten".

Renate Musan and Monika Rathert, Osnabrück/Wuppertal, July 2011

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A. Tense, mood, and modality

Eva-Maria Remberger

Tense and Volitionality*

1. Introduction

The interaction of tense and modality has been an issue ever since the polyfunctionality of modal verbs, particularly the distinction between their epistemic and deontic readings, was established as a matter for linguistic research (cf. Thomason 1984, Enç 1996, Diewald 1999). Recent publications such as Ehrich (2001), Abraham (2001, 2005), Stowell (2004), Laca (2006, 2008) and Demirdache/Uribe-Etxebarria (2008), among others, re-examine the subject under several different viewpoints. Modals introduce alternative worlds at a certain evaluation time (usually in the real world, unless in counterfactual contexts), but the alternative worlds can be anchored to different time-situations relative to the real-time situation.[1] It has also been noted by every researcher in the field of modality since Kratzer (1981) that the conversational backgrounds or modal bases she introduced, and against which alternative worlds are evaluated, are highly dependent on the time-relational situation of the modal construction itself.

Among the modal verbs, WANT, the verb encoding volitionality,[2] has often been shown to be an exception for several reasons, depending on the morphosyntactic and semantic properties of the language at issue (cf. Calbert 1975:5-6, Zifonun et al. 1997:1254f among others). With respect to German, the following properties of *wollen* that do not coincide with the properties of other modals (cf. Öhlschläger 1989:4, Heine 1993:72, Zifonun et al. 1997:1253) have been detected:

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* Part of the research for this paper was supported by a Feodor-Lynen-Fellowship granted by the Alexander von Humboldt-Foundation. Many thanks are also due to an anonymous reviewer who pointed out an error that now has been eliminated.

[1] In this paper, I will sometimes use the notion 'time', as in Reichenbach (1947), but I will also sometimes refer to 'time situations' or 'time-relational situations'. Thus, I use the term 'situation' not only for 'eventualities', i.e. both events and states occurring at the Reichenbachian event time, but also for all other kinds of 'times' in order to avoid any aspectual predefinition.

[2] WANT is meant to be a general name for the prototypical volitional verb that is instantiated by *to want* in English, *volere* in Italian, *vouloir* in French, *wollen* in German, *querer* in Spanish etc.

(1) Properties of modal verbs that are not applicable to German WANT, i.e. *wollen*:

a. Modal verbs have no imperative, but *wollen* has:
Wolle die Wandlung!
WANT-IMPERATIVE the transformation
(Rilke, *Sonette an Orpheus*, cf. Zifonun et al. 2000:1254)

b. Modal verbs are derived from old preterite-present forms, but *wollen* is not, since it is an old optative (cf. Birkmann 1987:157-162; 216-220; 374).

c. Modal verbs cannot take nominal objects, but *wollen* can:[3]
Jeder will den Frieden.
everybody WANT-3s the peace

d. Modal verbs cannot be passivised, but *wollen* can:
Der Friede wird von allen gewollt. (Eisenberg 2004:97)
the peace becomes by all WANT-PARTICIPLE

e. The subject of a modal verb and the embedded modalised proposition must be identical in reference; however, that is not true for *wollen*:
Ich will, dass Du gehst.
I WANT-3s that you go-2s

f. Modal verbs have no proper valency frame, but volitional *wollen* has: It clearly assigns a subject theta-role to its subject and its modalised complement must be compatible with the subject's wishes.

Some of these criteria are valid for WANT in other languages, too, and in most of them there are further criteria showing its exceptional behaviour: WANT is without doubt an atypical modal in all languages that possess such a verb. Still, WANT is highly polyfunctional (cf. also Fritz 2000), as illustrated by the following example:

(2) Er will krank sein.
he WANT-3s ill be
a. 'He is ill now and wants to be.'[4]
b. 'He is not ill but wants to be in a time to come.'
c. 'He claims to be ill.'

In a neo-Reichenbachian approach to time that involves two indirectly linked time-relations, Speech time to Reference time and Reference time to Event time, for every clause (cf. Reichenbach 1947, Vikner 1987, Klein 1994, Giorgi/Pianesi 1997, Demirdache/Uribe-Etxebarria 2000) and which will be the basis for the interpretation of tense in this paper, the examples in (2) can be represented as follows:[5]

---

[3] In German, in some cases, *können* is also allowed to select a direct object, provided it refers to a capability or skill.

[4] Strictly speaking, for an interpretation like the one given in (2)a, the finite form of WANT would normally be prosodically emphasised:
(i) Er WILL krank sein.

[5] S = Speech situation, R = Reference situation, E = Event situation; X_R: X is before R (precedence of X, posteriority of R), X,R: X equals R (coincidence), R_X: X is after R (subsequence of X, anteriority of R); subscript M = Matrix Modal; subscript E = Embedded; • stands for the fact that there is no direct link between S and E. The modal relation between matrix and embedded clause is kept neutral here by the pipe symbol '|'. However, it might be substituted by the necessity or possibility operator. Furthermore, modality has an impact on the first time relation of the embedded structure, as the following explanations will show.

(3) $T1_M$ $T2_M$ $T1_E$ $T2_E$

a. $S,R_M \bullet R_M,E_M \mid E_M,R_E \bullet R_E,E_E$ (for (2)a)

b. $S,R_M \bullet R_M,E_M \mid E_M\_R_E \bullet R_E,E_E$ (for (2)b)

c. $S,R_M \bullet R_M,E_M \mid E_M,R_E \bullet R_E,E_E$ (for (2)c)

The interpretation of (2a) is referred to the present situation (cf. (3a)) whereas (2b), which represents the unmarked case, has a 'futurate' reading (cf. (3)b). This representation, of course, still abstracts away from the multitudes of alternative worlds that could be introduced at every temporal situation relevant to modal evaluation. However, the behaviour of temporal ambiguity exemplified in (2) and (3) is valid for all modal verbs (for more details cf. section 2). Now the time-relational structure of (3c) (cf. (2c)) exactly corresponds to that of (3a) (cf. (2a)), but nevertheless the two interpretations for WANT are different: one is volitional and the other evidential. The representation of the following example is also twofold:

(4) Sie will einen Apfel gegessen haben.
she WANT-3s an apple eaten have

a. 'She wants to have eaten an apple.'
$S,R_M \bullet R_M,E_M \mid E_M\_R_E \bullet E_E\_R_E$

b. 'She claims to have eaten an apple.'
$S,R_M \bullet R_M,E_M \mid E_M,R_E \bullet E_E\_R_E$

In this case, two time-relational structures can be distinguished: the evidential interpretation in (4b) is the unmarked one, whereas the volitional interpretation in (4a) results only in given contexts, mostly with certain explicit temporal adverbials that unmistakably establish the reference time in the future as e.g. *bis morgen* 'by tomorrow' (cf. Remberger forthcoming).[6] (4) compared to (5) shows that the interpretation of modal verbs is somehow related to the time-relational situation of the construction:

(5) Sie will einen Apfel essen.
she WANT-3s an apple eat
'She wants to eat an apple.'
$S,R_M \bullet R_M,E_M \mid E_M\_R_E \bullet E_E,R_E$

(5) with an embedded simple infinitive has a volitional interpretation[7], whereas (4b), with an embedded periphrastic perfect infinitive, in its unmarked case, receives an evidential reading.[8] But (2), with an embedded simple infinitive, can also have an evidential reading whereas (5) is unambiguous concerning the volitional modal reading, although the temporal

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[6] Strangely enough, the interpretation in (4a) is often ignored e.g. in Abraham's example (6a) (2001:13).

[7] It would also have a volitional reading in the interpretation $S,R_M \bullet R_M,E_M \mid E_M,R_E \bullet E_E,R_E$, parallel to that of (2a), which is, however, pragmatically (and prosodically) marked.

[8] As for the distinction between epistemic modality and evidentiality, I assume that they belong to fundamentally different grammatical systems, one involving quantification over worlds (epistemic modality), the other encoding the "source of information" for assertions (evidentiality, cf. Aikhenvald 2004). However, later in this paper I will work with modal bases and individual anchors (cf. section 3), which makes it possible to treat both systems in a parallel way (by quantification).

specification of the embedded infinitive is in the present and thus in a way underspecified for both. The difference is that the embedded infinitive in (2) consists of a stative predicate and this property in combination with the present tense infinitive seems to offer an ambiguous reading; *einen Apfel essen* instead is an accomplishment and has no such obvious evidential reading. Thus Aktionsart in Vendler's (1957) sense also seems to play a role in the interplay of tense and volitionality.[9] However, here I will concentrate on tense and time-relations and their role in the interpretation of volitionality in WANT-constructions.

The aim of this paper is to describe and analyse several kinds of shift phenomena related to tense in general and to the time-relational organisation of volitional modal constructions with WANT in particular. In this way, even more properties of WANT which clearly distinguish it from other modal verbs will be established. Two of these phenomena, referred to here as the future shift (cf. section 4.1) and the evidential shift (cf. section 4.2) are more closely related to the modality of WANT than to modality in general; other shift phenomena, like the conditional shift (cf. e.g. Condoravdi/Kaufmann 2005) and the actuality shift (cf. Hacquardt 2006), are not restricted to WANT and will only be mentioned in the course of this paper. The overall organisation of the paper is as follows: In section 2, a general overview of the temporal properties of modal verbs and their complements will be provided. The peculiar modal WANT will be characterised with respect to its modal structure and meaning in section 3. Section 4 represents the core part of this paper, where the shift phenomena of WANT mentioned above will be discussed. The paper concludes with the summary and perspectives given in section 5.

2. The Temporal Selection of Modal Verbs

The WANT-constructions at issue in this paper will be confined to infinitive constructions, although WANT can also select finite complement-clauses, small clauses, nominal arguments etc.[10] To begin with, I assume that a construction with a modal verb and an embedded infinitive always originates in a bi-clausal structure. This bi-clausal structure might be synchronically or diachronically reduced in the case of many modals (especially in English[11]), but for WANT-constructions it is more than legitimate to stay with this assumption

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[9] Cf. also Abraham (2001) and the role of the feature [+terminative]; however, I think it would be more adequate to distinguish between combinations of lexical predicates and syntactic constructions that are either stative (like state predicates in the present tense, processes in the progressive, generic readings of present tense constructions etc.) or eventive (like achievement or accomplishment predicates in perfective constructions) (cf. also Laca 2006); others, e.g. Copley (2002) distinguish between constructions that do or do not have the subinterval property (cf. Dowty 1979).

[10] WANT can be said to appear in even more constructions than common modal verbs like CAN or MUST; for an overview on syntactic WANT-constructions in Romance cf. Remberger (2005).

[11] English modals are commonly interpreted as auxiliary verbs inserted in the structure under the IP/T, hence in a monoclausal structure. German modal verbs are less auxiliary-like than English modals (cf. Heine 1993:74 for a grammaticalisation scale concerning German and English modals), but still they do not select a *zu*-infinitive as other infinitive embedding verbs do. Italian

(cf. also section 3). In German a bi-clausal structure, i.e. one containing two pairs of time-relations can also be detected with other modals, e.g. *müssen*, at least on a morphosyntactic level[12], cf. (6):

(6) a. Hans musste angekommen sein.
H. MUST-PAST arrived be
'H. had to have arrived.'
$R_M\_S \bullet R_M,E_M \mid E_M,R_E \bullet E_E\_R_E$
b. Hans hätte angekommen sein müssen.
H. had arrived be MUST-PART/INF[13]
'H. should have (been) arrived.'
$S,R_M \bullet E_M\_R_M \mid E_M,R_E \bullet E_E\_R_E$

As (6) shows, T1 as well as T2 in the matrix clause can appear in a precedence relation (R_M_S and $E_M\_R_M$), even in cases where T2 of the embedded clause is also marked by precedence ($E_E\_R_E$)[14] (cf. (6b)). Since all these time-relations can be morphophonologically visible, it can be claimed that there is a biclausal structure. The relation T1 of the embedded clause, however, is strictly dependent on the temporal anchoring of the infinitive to the modal context, as will be explained in the following section. There, two aspects of modal constructions and their infinitival complements will be examined: first the tense selected by the modal, and second, the tense-aspect morphology of the modal itself.

In the neo-Reichenbachian representation chosen here, the first time-relation T1 of the subordinate clause – in matrix clauses usually that between the speech situation and the reference situation – encodes the relation between the time-relational context of the matrix-clause and the embedded reference situation. It has been observed that there is more than one possibility for an embedded infinitive clause to be temporally anchored to a matrix clause (cf. Enç 1987): Complement-clauses can be anaphorically anchored to the second time relation T2, i.e. R_M/E_M, of the matrix-clause (A-anchoring, following Demirdache/Uribe-Etchebarria 2007), but they can also be anchored deictically, i.e. directly to the speech situation (D-anchoring, following Demirdache/Uribe-Etchebarria 2007). A non-finite embedded complement clause containing an infinitive cannot have a direct link to the speech situation because it does not have a finite tense. Thus, the anchoring of the

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modal verbs are like full verbs, but they have restructuring properties, which means that they can appear in both monoclausal and biclausal structures (cf. e.g. Remberger 2008).

[12] I am aware that a clear distinction between visible morphological tense markers and the semantic encoding of time in complex constructions, i.e. between tenses and times, should be made. Such a distinction should also relate to a distinction between morphosyntactic derivations and morphophonological realisations. Distributed Morphology, embedded in the Minimalist Program, would be such formalism (for an application of this, cf. Pomino 2008). However, this paper principally attempts to deal with the semantic side, but still under a derivational point of view.

[13] The label PART/INF denotes the so-called German *Ersatzinfinitiv*, which functions as a participle for a restricted class of verbs in certain contexts, among them the German modals.

[14] A combination of two T2s marked in this way in the past perfect in the main clause as well as in the embedded clause creates a problem (mainly concerning aspect) on the interpretational level, which is resolved by the counterfactual operation of the conditional, cf. also the examples in (13) and fn. 49.

time-structure of an infinitive is always anaphoric.[15] Furthermore, the first time-relation T1 of an infinitive is normally underspecified and highly dependent on the event-situation of the matrix clause, whereas the second time-relation can be explicitly encoded as E_E,R_E or $E_E\_R_E$[16]. The underspecified first time-relation T1 can be instantiated as simultaneous (Anchor,R_E) or as posterior (Anchor_R_E). A prerequisite for modal contexts is that there is an accessibility relation (cf. Kratzer 1981) between the evaluation time of the modal (in the matrix clause) and the modalised worlds (in the complement clause). In this paper, it is mainly the temporal properties of this accessibility relation that will be examined. Thus, in modal constructions, the anchoring between matrix and embedded clause is taken to be a link from the embedded reference time to the event situation of the matrix clause containing the modal predicate, i.e. to the event time of the modal (= the Anchor). This event time of the modal can be equated with the modal evaluation time.[17]

Modal verbs are often said to be future-oriented: they are called “pretime-verbs” by Klein (1994), they are characterised as “future-projecting” in their deontic (root) use (cf. Eide 2003) and, semantically, they have been defined as quantifiers over “sets of future worlds” (cf. Quer 1998). Indeed, the modals of necessity in particular often happened to be grammaticalised as future markers (cf. Fleischman 1982, for Romance, and section 4.1). It has also been shown that the interpretation of future eventualities involves the same mechanisms as the interpretation of modals (cf. Copley 2002); moreover, it has also been claimed that future tense auxiliaries are not tense markers proper, but modals (for German, cf. Vater 1975).

However, it has also been noted that the futurate or prospective orientation of modals is only their preferred or unmarked use (cf. Klein 1994:174), that the future situation introduced by a modal "may in fact already hold at the modal’s evaluation time" (Eide 2003:128), and that it would be more exact to say that a modal projects a set of "non-anterior" reference worlds (cf. Quer 1998:50). So what is excluded for the infinitival complement of a modal in its root interpretation is an anterior anchoring for its reference situation, which explains why example (7a) in German is ungrammatical (cf. also Klein 1994):

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[15] Cf. Stowell (1982), who also maintains that infinitives have a temporal reference frame, although they have no morphological tense inflection.

[16] Infinitives can appear in compound versions, including perfect auxiliaries like HAVE and BE. Thus they must have at least a full IP/T-structure, hosting two temporal relations, T1 in I/T and T2 in a lower functional projection, e.g. a predication phrase in the sense of Bowers (1993), cf. Remberger (2006:ch. 4). However, the temporal interpretation of infinitives given in Remberger (2006) required modification and is thus different from the one proposed now in this paper.

At least for Latin, one must assume that infinitives can also encode a prospective reading $R_E\_E_E$ since Latin has the prospective infinitive with the participle in *-urum* + the infinitive *esse*.

[17] Demirdache/Uribe-Etxebarria (2007) call the modal evaluation time MOD-T and interpret it syntactically as an argument of a modal head. Laca (2008:fn. 9) proposes equating the evaluation time of the modal with the reference time of the clause (the assertion time following Demirdache/Uribe-Etxebarria 2000, the topic time following Klein 1994). In the notational system proposed here, which relies on an underlying biclausal temporal structure for infinitive constructions, and especially those with WANT, two reference situations are given. If these clausal structures are reduced to a monoclausal structure, then of course both reference times have to be conflated to a single reference time: such a modal would be interpreted as an auxiliary and thus could not have its own event time; nevertheless, there is a modal evaluation time in a monoclausal structure too, which must coincide with the only reference time in the structure.

(7) a. *Hans muss gestern arbeiten.
H. MUST-3s yesterday work
'*H. must work yesterday.'
$*S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M/R_E \bullet E_E,R_E$ with E_E/R_E_S (*gestern*)

b. Hans musste gestern arbeiten.
H. MUST-past.3s yesterday work
'H. had to work yesterday.'
$R_M\_S \bullet R_M,E_M \mid \text{Anchor}=E_M/R_E \bullet E_E,R_E$ with E_E/R_E_S (*gestern*)

In (7), the time adverbial *gestern* 'yesterday', which is explicitly anterior to the speech situation[18], is incompatible with the modal meaning of *müssen* 'must': From E_E/R_E_S (*gestern*) and the time-structure of the matrix clause it must be deduced that the reference situation of the embedded clause is before the event situation of the matrix clause, thus $R_E\_E_M$.[19] But this is an anterior anchoring for T1 of the embedded infinitive and as such forbidden for a deontic modal reading ($*R_E\_E_M$). (7)b instead is grammatical since the reference time of the matrix clause is anterior to the speech time, as is the reference time of the embedded clause.[20] The ungrammaticality of (7a) also holds for its English translation. In contrast, in (4a) above, no explicit reference time for the embedded event is given and, although there is a precedence-relation in the embedded clause, namely T2, where the embedded event situation precedes the embedded reference situation, a reference time posterior to the matrix event situation can be inferred resulting in a reading that situates the embedded reference situation in the future and the embedded event situation to an unspecified time before this futurate situation. Thus the "non-anteriority" requirement is strictly connected to the time relation E_M/R_E (T1 of the embedded infinitive), where R_E is not allowed to precede E_M. Generally, for modals, a posterior as well as a simultaneous reading for R_E is allowed, as we have seen in the interpretations in (2a) and (2b); cf. also the following examples:[21]

(8) a. Anna will *in diesem Moment* arbeiten.
A. WANT-3s in this moment work
'A. wants to work at the moment.'
$S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M,R_E \bullet E_E,R_E$ with $S,R_E/E_E$ (*in diesem Moment*)

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[18] *Gestern* 'yesterday' is a time adverbial that establishes a direct (deictic) relation to the speech situation. As a temporal adverbial, it can be either linked to the event or the reference situation.

[19] In short form, $S,R_M,E_M/R_E,E_R$ (= (7a)) with *gestern* R_E/E_R_S would necessarily give rise to a resolution of E_M/R_E in $R_E\_E_M$ which is the forbidden relation. The same is valid for (7b).

[20] Examples like (7b) are not possible with the English class of modals because these cannot mark anterior relations; thus, the translation has to resort to a complex modal expression involving the verb *to have to*.

[21] In (8a), the temporal adverbial *in diesem Moment* 'at the moment' could also refer to the event time of WANT. With WANT it is possible to make the two reference times of a biclausal structure visible by using two different temporal adverbials, cf. (8b). This is not so easy for other modals. This again shows that WANT is peculiar compared to other modal verbs.

b. Nun will Anna *morgen* arbeiten.
Now WANT-3s A. tomorrow work
'Now A. wants to work tomorrow.'
$S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M\_R_E \bullet E_E,R_E$ with S_R_E/E_E (*morgen*) and S,R_M (*now*)

The temporal anchoring for the embedded infinitive and a deontic modal reading can be formalised as follows:

(9) Deontic modals: $S/R_M \bullet R_M/E_M \mid \text{Anchor}=E_M/R_E \bullet E_E/R_E$ with $*R_E\_E_M$

In many cases, if a deontic modal reading is incompatible with an anterior (i.e. $R_E\_E_M$) reading, this can nevertheless be accommodated by the shift of the evaluation time of the modal operator to the referential context of the main clause, i.e. to the matrix reference situation: this cancels the deontic modal event-structure inherent to the matrix clause (and therefore the root meaning itself) and establishes a modal evaluation at the matrix reference time (i.e. the situation the speaker is referring to):

(10) Hans muss gestern gearbeitet haben.
H. MUST-3s yesterday worked have
'H. must have worked yesterday.'
a. $\#S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M\_R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
b. $\#S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
c. $S,R_M \bullet R_M,$~~E_M~~ | ~~Anchor=E_M~~$,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
d. $S,R_M \mid \text{Anchor}=R_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)[22]

The time-relational structure of a deontic reading (cf. (10a) and (10b)) is almost always incompatible with the adverbial *gestern*, with the futurate as well as with the simultaneous reading of the anchored T1.[23] However, the structure in (10)b (the simultaneous reading for the anchored T1) can be accommodated by the neutralisation of the root meaning through cancellation of the event E_M, cf. (10c), and the shift of the time of modal evaluation to the reference time (R_M) (cf. also Laca 2008, as mentioned in fn. 17). The result is a structure where only one event situation but two reference situations are present: one is the modal evaluation time of the modal operator and the other is the reference situation of the modalised proposition. Notice that the first time-relation of the former matrix clause is still variable and must therefore be present in the structure:

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[22] Indeed, *gestern* is to be interpreted as E_E_S in this case.

[23] As an anonymous reviewer points out, the following interpretations could theoretically be possible:
(i) $E_E\_S,R_M,E_M\_R_E$
(ii) E_E_S,R_M,E_M,R_E
which both would be compatible with *gestern* as E_E_S. And indeed, one could get such a deontic reading in very particular contexts, such as the following (in short form):
(iii) Context for (i): the monthly meeting of our company is in two days. Everybody must have worked on certain days. By then (=R_E), I must have worked today; and John must have worked yesterday [= *Hans muss gestern gearbeitet haben* – with a deontic reading].
Of course, cases like that are pragmatically rare: to talk about a reference situation which lies after the actual speech situation but is related to a event situation which lies before the actual speech situation seems to be a logically possible but pragmatically marked detour. However, since these examples are not totally out in a deontic reading, in what follows, I will mark them with #.

(11) Hans musste damals gearbeitet haben.
H. MUST-past3s damals worked have
'H. had to have worked at that time.'
a. $\#R_M\_S \bullet R_M,E_M \mid \text{Anchor}=E_M\_R_E \bullet E_E\_R_E$ with E_E/R_E_S (*damals*)
b. $\#R_M\_S \bullet R_M,E_M \mid \text{Anchor}=E_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*damals*)
c. $R_M\_S \bullet R_M,$~~E_M~~ $\mid$ ~~Anchor=E_M~~,$R_E \bullet E_E\_R_E$ with E_E/R_E_S (*damals*)
d. $R_M\_S \mid \text{Anchor}=R_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*damals*)

In (11), the embedded proposition is anchored to a modal evaluation time that lies before the speech time: This could be the case, for example, in a context of personal narration (*erlebte Rede*) or free indirect discourse, where this modal imperfect might be employed. The important fact is that the second time-relation T2 of the former matrix clause is not present in a structure that provides an epistemic meaning. Indeed modals never have an epistemic reading (as in (12)) in constructions where the second time-relation T2 is marked, e.g as $E_M\_R_M$, cf. (13) and (14):[24]

(12) a. Anna muss ihn gesehen haben.
A. MUST-3s him seen have
'A. must have seen him.'
$S,R_M \bullet R_M,E_M \mid E_M\_R_E \bullet E_E\_R_E$ (deontic)
$S,R_M \bullet R_M,$~~$E_M \mid E_M,$~~$R_E \bullet E_E\_R_E$ (epistemic)
b. Anna musste ihn gesehen haben.
A. MUST-past.3s him seen have
'A. had to have seen him.'
$R_M\_S \bullet R_M,E_M \mid E_M\_R_E \bullet E_E\_R_E$ (deontic)
$R_M\_S \bullet R_M,$~~$E_M \mid E_M,$~~$R_E \bullet E_E\_R_E$ (epistemic)

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[24] As Abraham (2001:13) notes, in German, epistemic modals cannot appear in periphrastic forms. This is not only valid for the perfect compound tenses, but also for the periphrastic future. Although a modal construction with the main clause in the periphrastic future (with *werden*) results in an epistemic reading, this is not due to the epistemic interpretation of the modal, which has a deontic reading in this case, but to the epistemic interpretation of the morphological future itself, cf. (i):
(i) Anna wird ihn gesehen haben müssen. (epistemic & deontic)
A. will him seen have MUST- PART/INF
'A. will have to have seen him.'
The formation of a periphrastic past in the future form with an embedded perfect infinitive is also virtually impossible, since this gives result to an ungrammatical construction, cf. (ii), probably again due to an aspectual incompatibility similar to the cases that are resolved by the conditional shift (cf. fn. 14, 25, and 49) which is also caused by two marked T2-relations:
(ii) *Ich werde ihn gesehen haben haben müssen.

(13) a. *Anna hat ihn gesehen haben müssen.[25]
A. has him seen have MUST- PART/INF
$S,R_M \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E\_R_E$ (*deontic)
$S,R_M \bullet E_M\_R_M \mid E_M,R_E \bullet E_E\_R_E$ (*epistemic)
b. *Anna hatte ihn gesehen haben müssen.
A. had him seen have MUST- PART/INF
$R_M\_S \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E\_R_E$ (*deontic)
$R_M\_S \bullet E_M\_R_M \mid E_M,R_E \bullet E_E\_R_E$ (*epistemic)
c. Anna wird ihn gesehen haben müssen.[26]
A. will him seen have MUST- PART/INF
$S\_R_M \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E\_R_E$ (deontic)
$S\_R_M \bullet E_M\_R_M \mid E_M,R_E \bullet E_E\_R_E$ (#epistemic)

(14) a. Anna hat ihn sehen müssen.
A. has him see MUST- PART/INF
$S,R_M \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E,R_E$ (deontic)
$S,R_M \bullet E_M\_R_M \mid E_M,R_E \bullet E_E,R_E$ (*epistemic)
b. Anna hatte ihn sehen müssen.
A. had him see MUST- PART/INF
$R_M\_S \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E,R_E$ (deontic)
$R_M\_S \bullet E_M\_R_M \mid E_M,R_E \bullet E_E,R_E$ (*epistemic)

The fact that an epistemic modal cannot appear in a perfect form can be explained by its reduced structure. As said before, in an epistemic reading the evaluation time of the modal, the anchoring situation for the reference time of the infinitival clause is shifted to the context time of the matrix clause, i.e. the reference situation of the utterance. This shift is only possible if there is no marked time-relation in between, i.e. if there is a simultaneous time relation that can be neutralised. A second time relation T2 of the matrix clause with $E_M\_R_M$ cannot be neutralised and the shift from E_M to R_M is thus impossible. The first time relation T1 allows the epistemic shift even if marked (cf. (11) and (12b)) since the link to the modal evaluation time can be either direct to the deictic origin of the text or to the reference situation inherent to the text, e.g. in a narration.

In Kratzer's (1991) semantics of relative modality, the shift from a deontic to an epistemic meaning can be accounted for in terms of the modification of the modal base. Modal bases serve as restrictors to the quantifier contained in the modal operator, and they must have temporal indices. Whereas a deontic modal base for MUST could contain sets of propositions or worlds concerning obligations, norms, duties etc., an epistemic modal base contains sets of propositions or worlds of knowledge (often the knowledge of the speaker, who then is the 'individual anchor' for the epistemic modal base in the sense of Farkas

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[25] In (13a, b), the deontic reading is also impossible, despite the fact that the non-anteriority condition is not violated. The construction proves ungrammatical for other reasons, namely the double occurrence of the past perfect (= two marked T2-relations in the past), which can only be rescued by a conditional, cf. fn. 14 and 49 (the "conditional shift" not handled in the present paper).

[26] Here the epistemic reading of the future auxiliary *wird*, which is also an option, cf. fn. 24, is not considered.

1992).[27] Thus, the evaluation time of a modal operator MUST is co-indexed with one or more modal bases.

To sum up, there are two properties with respect to time-structure for epistemic modal constructions relevant to this paper: first, there is no modal event time, hence no T2 for the modal, but only a T1 which contains the evaluation time of the modal operator; second, the T1 of the modalised proposition is always simultaneously anchored to the modal evaluation time:

(15) Epistemic modals: $S/R_M \mid \text{Anchor}{=}R_M,R_E \bullet E_E/R_E$

A temporal derivation like the one proposed here would also reflect the fact that epistemic structures are syntactically reduced (e.g. raising structures) whereas deontic structures might be, at least time-structurally, more complex (possibly control structures, but see Wurmbrand 2001). Some of the restrictions elaborated here for epistemic modals are also valid for the evidential use of WANT, but for slightly different reasons, as will be shown later (cf. section 4.2). As has been observed, for the epistemic reading of modals, there is also a non-finiteness gap (cf. Abraham 2001), i.e. epistemic modals only can appear in finite forms, but not as participles, infinitives or gerunds (this is correlated, at least in part, to the missing T2). However, this gap will not affect the evidential use of WANT (cf. section 4.2 and Remberger (forthcoming)).

3. The Modal Structure of WANT

In this section, the modal structure of WANT, as well as its semantic and syntactic properties, will be described. One of the most striking peculiarities of the modal verb WANT is that it seems to provide a proper theta-role for its subject: volitional WANT is not possible with null-place predicates (cf. (16)) or inanimate subjects (cf. (17)). Furthermore, if the modalised proposition contained in the complement of WANT is incompatible with the (supposed) intentions of the subject, the sentence proves ungrammatical (cf. (18)):[28]

(16) a. Tomorrow it may rain.
b. *Tomorrow it wants to rain.[29]

(17) a. This bike may cost 700 Euro.
b. *This bike wants to cost 700 Euro.

(18) a. John may be punished, if he does this.
b. *John wants to be punished, if he does this.

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[27] Farkas (1992) and Giannakidou (2009) claim that modal bases must be individually anchored; the anchor can be the speaker, the context, but also an explicit syntactic argument.

[28] The following examples are in English for sake of simplicity. However, the discussion is also valid for the parallel examples from German or other languages.

[29] However, *it wants to rain* in a prospective reading is not all that rare in English (cf. the www, where you get more than 100.000 Google hits for this sentence <25. May 2010>).

This shows that WANT has its own argument structure (valency frame) and that it selects an animate, volitional (or intentional) subject. This is different from other modal verbs which, contrary to what is shown for WANT, usually have no theta-roles of their own to assign; thus, the propositional meaning of a modal construction is not changed in the active-passive alternation (voice-neutrality, cf. Palmer 1990:159, cf. (19a) vs. (19b)), whereas with WANT there is a clear semantic difference (cf. (20a) vs. (20b)):

(19) a. John may/should/could/will fire the porter.
b. The porter may/should/could/will be fired by John.

(20) a. John wants to fire the porter.
b. The porter wants to be fired by John.

From the presence of a subject-theta role for WANT in a main clause its control property in infinitive constructions also follows:

(21) John$_i$ wants PRO$_i$ to fire the porter.

Hence, a WANT construction with an embedded infinitive like (21) represents a biclausal structure with two argumental subjects, one for the main clause and one for a subordinated CP.[30]

WANT has its own valency frame and theta-selectional semantic and syntactic properties, but it also contains a modal operator. It has been shown (cf. e.g. Calbert 1975, Remberger forthcoming, among others) that the basic modality of WANT is one of necessity. Thus it involves universal quantification (cf. also Giannakidou 2009). As far as the modal base of WANT is concerned, there have been several approaches: Most researchers assumed that WANT introduces a bouletic modal base (e.g. Kratzer 1981, 1991) but recently it has also been proposed that volitional modality must rely on a doxastic (cf. Heim 1992, Fintel 1999, Hacquardt 2006) or epistemic (Giannakidou 2009) modal base.[31] In any case, however, the modal base of WANT is strictly connected to the external subject of WANT, to which the volitional theta-role is assigned and which needs to be [+animate] and [+volitional].[32] The subject-orientation of WANT consists of the fact that the individual anchor (cf. Farkas 1992) of the modal base of WANT is clause-internally connected to the thematic subject. A bouletic modal base for WANT would consist of all sets of propositions or worlds that can be wished or desired by the individual subject. An epistemic modal base would consist of all sets of propositions that are part of the experience or world knowledge of the individual subject, a doxastic modal base in all sets of propositions including the belief worlds of the subject. As Heim (1992) stated, there are contexts for a WANT-construction where the modal base must be doxastic/epistemic:

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[30] A control structure must be a CP, where the C-head either assigns null-case to the empty subject PRO (in a more recent generative approach) or, by its status as a barrier, prevents PRO from being governed (in an earlier generative approach). In English, of course, WANT is also an ECM-verb, cf. (i):
(i) John wants me to fire the porter.

[31] The distinction between belief worlds and knowledge worlds (cf. also Kaufmann et al. 2005:82, 86) is certainly difficult to grasp in this case. The question, however, is if wanting implies a preorder relative to what is actually believed (doxastic) or known (epistemic) by the subject or if it does not imply an actual modal base of this type at all.

[32] The theta-role of WANT, contrary to Calbert (1975: 16, 18, 22) and Abraham (2005:261), is not one of an Agent (at the very most, a "virtual Agent"): WANT, in fact, needs an Experiencer to assign its theta-role (cf. Diewald 1999; Hacquardt 2006: 170, Remberger forthcoming).

(22) Next year the lecturer for Spanish wants to teach on Mondays.

Heim states that it is not very probable that the idea of teaching belongs to the lecturer's wishes. There is a doxastic or epistemic condition to her teaching: She (believes or) knows that, as a lecturer, she has to teach, which is part of her world knowledge, and with respect to this conversational background she would prefer to teach on Mondays. Hence one could propose that in this case, there are two modal bases, an epistemic (or realistic) one and a bouletic one, and that both are co-indexed. The situation is different in the following example:

(23) The lecturer for Spanish doesn't want to teach at all.

Here, in spite of the common knowledge of a lecturer that she has to teach, the bouletic modal base against which the alternative worlds encoded by the embedded proposition is evaluated has little to do with her world knowledge that lecturers have to teach. Thus it cannot be co-indexed with an epistemic modal base. A way to explain these differences in the presence (and co-indexation) of modal bases would be to connect it to the way (via the accessibility relation) in which a modalised proposition is anchored to a main modal clause: since the temporal non-anteriority restriction explained in section 3.1 (cf. (9)) can have two instantiations, one of coincidence and one of subsequence, these two relations could be transferred to the indexation of the modal base: In (22), the bouletic modal base is co-indexed with the modal evaluation time and can thus be interpreted as coincident or conditioned by actual world knowledge in the sense of an epistemic judgement. In (23) instead, the modal base is not co-indexed to an epistemic base at the modal evaluation time. Thus, in WANT-constructions there may always be two modal bases, the bouletic one, which is connected to volitionality, and an epistemic one which could count as an ordering source in the sense of Kratzer (1981, 1991), since it serves to establish relative distances between possible worlds. One important fact seems to be that modal bases cannot only contain different conversational backgrounds but that they can also be connected to different temporal situations (co-indexed or not).[33]

To sum up the properties of volitional WANT relevant to the argument of this paper, the following characterisation is provided:

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[33] Quer (1998) e.g. assigns a future epistemic modal base M_{EFut} (versus a normal epistemic modal base M_E) to modal constructions.

(24) Properties of the modal structure of WANT (volitionality)
   a. Like other modals, WANT has a non-anteriority restriction.
   b. Unlike other modals, WANT has a subject theta-role.
   c. Unlike other modals, WANT has control-properties.
   d. The basic modality of WANT is necessity.
   e. The modal base of WANT is bouletic.
   f. A second, epistemic modal base may be introduced.
   g. Both modal bases are connected to the external argument of WANT as an individual anchor. Time-relationally, they may or may not be co-indexed.

Shifting phenomena concerning one or more of these properties that characterise WANT can take place on several levels: Structures violating the non-anteriority restriction inherent to deontic modality can be accommodated by a shift in character of the modal base; the individual anchor of the modal base can shift as well, e.g. from a sentence internal argument, to an arbitrary reference or to the speaker; the syntactic suppression of the subject theta-role or a semantic incompatibility of the element in subject position with intentionality can result in loss of volitionality as well as in loss of the control property; especially in negated contexts, modal necessity can be reinterpreted as a non-realised possibility (cf. e.g. Ehrich 2001); in addition, diachronically the modal meaning of necessity can get lost and give way to a future meaning etc. Some of these phenomena are, of course, connected to one another. The next section will discuss two shift phenomena in WANT-constructions related to tense.

4. Tense-Related Shift Phenomena

As before, tense here is a cover term for tense-related issues, such as the temporal relations expressed by tense-adverbials and tense-morphemes, their overt realisation and their semantic meaning concerning times. In section 4.1 the shift from the use of WANT as a volitional modal verb to a future auxiliary will be discussed and formalised. In section 4.2 the shift from volitional modality to evidentiality will be examined.

4.1. The future-shift of WANT

In section 2 it has been shown that deontic modals have the virtual property of being future projecting. Thus, WANT, which basically encodes necessity, can project a complement whose reference situation is posterior (more exactly, non-anterior) to its evaluation time. This property of WANT has led to the well-known grammaticalisation process of WANT as a future marker (cf. also Heine/Kuteva 2000:310-311, Bybee/Perkins/Pagliuca 1994), encoding an intention-based future time reference (cf. Dahl 2000) as a first step. In the following examples from different languages, the future is expressed by an auxiliary or an invariable particle stemming from the corresponding verb WANT[34]:

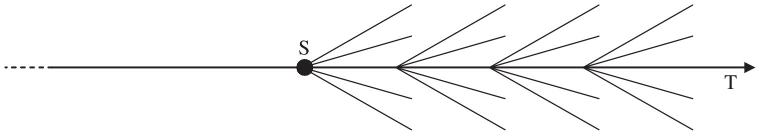
(25) English Tomorrow she *will* write a letter. (*will* < WANT)

(26) Romanian Mîine *va* scrie o carte. (*va* < WANT)

(27) Greek Avrio *tha* grapsi to grama. (*tha* < WANT)

The process of grammaticalisation from modals to a future marker mainly concerns modals expressing necessity, i.e. universal quantification, not modals of possibility.[35] The following analysis of the future shift relies on the modal structure of WANT and the "asymmetry between a fixed past and an open future" (Kaufmann et al. 2005:99) strictly connected to modality. From a logical-philosophical point of view, it can be stated that future worlds are always metaphysically uncertain, whereas non-future worlds are metaphysically certain (cf. Kaufmann et al. 2005, Copley 2002). This fact that in metaphysical terms, all propositions are necessarily false or true before the actual world time situation is called the *historical necessity* (cf. Thomason 1984, Kaufmann et al. 2005, Laca 2008):

(28) Metaphysically possible alternative worlds (adapted from Laca 2008:121)



This means that in a certain speech situation S all past worlds can be modalised only by including at least a totally realistic epistemic modal base anchored to the speaker. However, the speaker's knowledge might not be metaphysically comprehensive, thus an epistemic modal base connected to the speaker can express certainty or uncertainty towards anterior and present worlds as well. On the other hand, assertions concerning future worlds should always appear as marked for metaphysical uncertainty. But it seems that metaphysical modality (cf. Copley 2002) is not an issue here: speakers talk about future worlds in the future tense and seem to evaluate them against realistic modal bases (cf. the prediction-based future time reference established by Dahl 2000). If they do not use the future tense when talking about posterior worlds, because they want to express uncertainty concerning its possible or necessary realisation, then they use deontic modal constructions.[36] Thus the division of labour for deontic and epistemic modality seems to fall out naturally from the principle of historic necessity, as observed also by Laca (2008):[37]

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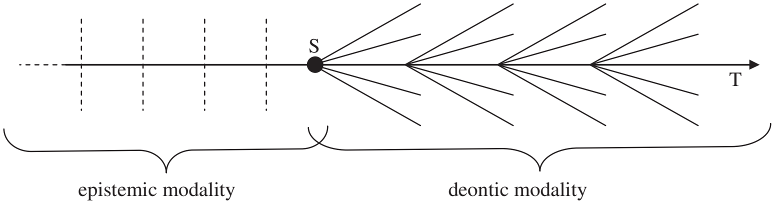
[34] The Romanian future auxiliary still inflects for person and number; furthermore, in Romanian, there is also another, invariable form of WANT, *o*, plus the subjunctive particle *să* to mark the future. The Greek future particle is invariable, as is modern English *will*.

[35] Sources for future auxiliaries are verbs of movement, obligation, volition, transition, cf. Bybee, Perkins/Pagliuca (1994), Dahl (2000:313).

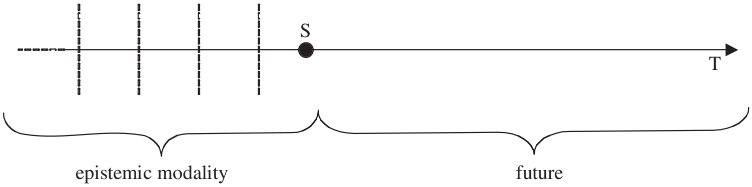
[36] Interestingly, there is no such thing as a future infinitive in modal verb constructions, since the modal verbs themselves provide the future-oriented (or non-anterior) anchor for the embedded infinitive.

(29) Modality applied to metaphysical worlds



Now, one could say that the future tense treats metaphysical future worlds as if there was a principle of *future necessity*, i.e. a closed future with no alternatives:

(30) Epistemic future / future necessity



In this representation, future is a modality only in the same way as an assertion in the present tense or past tense would be modal: modal in the sense that the future worlds under discussion are evaluated against the realistic epistemic modal base individually anchored to the speaker. Thus, if a subjective epistemic modal base (expressing uncertainty) for past worlds is paralleled by deontic modality for future worlds, a realistic epistemic modal base (expressing certainty) for past worlds (past tense) is paralleled by the future tense for future worlds. Note that there is only a subtle difference between the epistemic modal bases, which are either realistic or subjective. The main difference lies in quantification: whereas in an epistemic modal construction there is quantification over knowledge worlds, there is either no quantification or universal quantification over one existing world in assertions: there is just one actual world, modal base and actual world are identical, and thus an assertion does refer to the actual world directly.[38]

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[37] Laca (2008:120-122) introduces a second principle to explain why alternative world semantics is also applicable to past worlds in epistemic modal constructions. This is the principle of *diversity*, which disallows sets of single elements as restrictors (i.e. modal bases) for quantification (i.e. its modal evaluation). Since the past contains only one single metaphysical world, subjective epistemic modality can introduce subjective alternative worlds, which are necessary for the evaluation of such a modal expression. Another way to introduce alternative past worlds is counterfactuality (cf. Laca 2006).

[38] In the sense of D-linking: if there is any quantification, then in the sense of Russell's formalisation of definite descriptions.

Now let us return to WANT as a future auxiliary. In a time-relational approach, parallel to that adopted in the previous sections, the development from volitional modality to a future marker can be sketched as follows:

(31) Future Shift of WANT
a. $S,R_M \bullet R_M,E_M \mid \text{Anchor}=E_M\_R_E \bullet R_E,E_E$
b. $S,R_M \bullet R_M$~~$,E_M \mid \text{Anchor}=E_M$~~$\_R_E \bullet R_E,E_E$
c. $S,R_M \bullet \mid \text{Anchor}=R_M\_R_E \bullet R_E,E_E$
d. $S,$~~$R_M \bullet \mid \text{Anchor}=R_M$~~$\_R_E \bullet R_E,E_E$
e. $S\_R \bullet R,E$

In the volitional use of WANT, as given in (31a), we have a bi-clausal structure, where WANT encodes deontic modality, i.e. necessity with a modal base (or more modal bases) anchored to an individual anchor which is co-referent with the syntactic subject (the external argument) of WANT. The basis of the development from modal WANT to future WANT must be the posterior anchoring, i.e. $E_M\_R_E$, not the simultaneous anchoring, as it would be in the epistemic shift of the other modals. The next step is a shift in the modal base. We have seen before that the modal base of WANT is bouletic, but that an epistemic modal base, also anchored to the subject, can be likewise present in constructions where what is wanted is also considered to be epistemically necessary. In this case, the subject's property of being intentional is essential: intentionality requires an epistemic modal base that is broadly realistic. Thus, the bouletic modal base might be lost and the epistemic modal base takes the role of the restrictor against which the alternative worlds are evaluated: note that there are indeed constructions where the volitional meaning is nearly lost, but a modal base anchored to the subject is still present:

(32) Ich will Dir dabei helfen.
I WANT-3s you-dat with-it help
'I will help you with that.'
$S,R_M \bullet R_M,E_M \mid E_M\_R_E \bullet R_E,E_E$

Here, the modal base of *wollen* is more related to a world containing epistemically possible alternatives than to worlds containing what is wished or desired by the subject. (32) is still a control structure where the subject of WANT and the subject of the embedded clause are co-referent. Moreover, the finite verb is in the first person, which is surely animate and furthermore coincident with the speaker. The future now develops in further stages, first with the deletion of the modal event time parallel to the epistemic shift, cf. (31c): With the deletion of the modal event time, i.e. with the deletion of the modal event, WANT loses is status as a theta-role assigner. A verb with no argument structure cannot encode an event situation. Thus it is here where the individual anchor of the modal base (now epistemic) to the subject is lost and shifted to a contextual anchor: the epistemic modal base is now anchored to the speaker, and the evaluation time of the modal is the time the speaker is talking about, i.e. R_M. However, it is still an epistemic modal base connected to necessity. Only at the final stage, when the epistemic base connected to the speaker becomes realistic, i.e. necessarily (and not possibly) identical to the world it quantifies over, namely the actual world, then the future tense meaning is reached.[39] The time of evaluation of a realistic epistemic base is always the speech situation, as in every assertion (cf. Kaufmann et al. 2005:101)[40]. The former complex relation S,R_M • $R_M\_R_E$ • R_E,E_E is conflated to S_R_E • R_E,E_E by deletion of the modal evaluation time R_M, cf. (31d), and thus a complete reduction of the clause structure to a monoclausal structure containing only two time-relations, cf. (31e); WANT now is a future auxiliary.

In principle, this "necessity settlement" (cf. Kaufmann et al. 2005) for modals is possible with all deontic modals of necessity. It is not possible with possibility modals, since the evaluation of the future necessarily includes universal quantification. It is epistemically necessary for the speaker that the proposition encoded in his utterance becomes true in the one and only future world he considers. The question of why this shift also happens with WANT can be answered by considering the subject-linking property of WANT to an intentional external argument. If intentionality is defined by the commitment of an individual towards the complement of intentionality, then an intentional subject is most appropriate for the expression of a future. For future and futurate meanings, Copley (2002) has identified 'commitment' as a modal base (the same modal base that has been defined as epistemic here). The difference between volitional modality and future tense then lies in the individual anchoring of the modal base: in volitional constructions it is anchored to the syntactic subject; in assertions in the future tense it is anchored to the speaker.

The subject of a future construction is totally independent from the former theta-role of WANT. Indeed there are two conditions for the development to a future auxiliary out of volitional WANT. The first is that the complement of WANT is a proposition, and not an argument (e.g. not *John wants a beer*), since only a complex structure containing another verbal predicate can guarantee the development of WANT to a mere auxiliary marker of the future. And second, the subject of WANT and the subject of proposition must be identical in reference (e.g. not *John wants Mark to leave*), since in this case the empty syntactic subject position of the embedded infinitive (represented by PRO) can be reinterpreted as a trace and then completely deleted only in control structures (and not e.g. in ECM structures). However, the development from modal WANT to a future marker is not an automatic process in the sense of polyfunctionality, as shown by the deontic vs. epistemic interpretation of modals in general. The development to a future auxiliary is a grammaticalisation process (cf. also Fleischman 1982 for Romance, Pappas/Joseph 2002 and Roberts/Roussou 2002 for Greek, Palmer 1990 for English *will*, among many others). Diachronically it is sometimes difficult to establish when WANT has reached the status of a future modal. There are, however, two relevant tests: first, the inanimateness test, cf. (33), and, second, the voice neutralisation test (already mentioned above), cf. (34):

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[39] WANT has indeed been on a grammaticalisation path towards the future in the history of the German language, but was then substituted by *werden* 'to become' cf. Diewald (1999:329).

[40] "In asserting a sentence, the speaker signals that she believes that it is true." I.e. assertion implies a totally realistic epistemic modal base with the speaker as an individual anchor. It is thus reasonable to assume that this modal base is connected to the speech situation (and syntactically to the functional category in which sentence mood is encoded, i.e. C).

(33) The house will belong to my nephew.

(34) a. Certain drugs will improve the condition. (following Palmer 1990:159)
b. The condition will be improved by certain drugs.

An inanimate subject like *the house* can no longer lead to a volitional interpretation. The examples in (34) show that *will* is indeed voice neutral in English (cf. the parallel example with *want* in (20), where voice-neutrality is absent).

The analysis proposed here implies that it is an epistemic interpretation of WANT that leads to its grammaticalisation as a future marker in some languages. In fact, there is a non-finiteness gap (cf. Abraham 2001) for future auxiliaries, as there is for epistemic modals: they never can appear in the form of an infinitive, a participle or a gerund.[41] This is exactly the point where WANT, namely as a future auxiliary, goes together with the epistemic use of modals. The evidential use of WANT, as found in German, on the other hand, does not show this finiteness gap and is not an epistemic modal. For this and for other reasons which shall be explained in the next section, the evidential use of WANT is fundamentally different from the epistemic use of other modal verbs.

4.2. The evidential shift of WANT

Although it has often been claimed that the evidential use of WANT in German as in (4b), here repeated as (35), is an epistemic use of the modal WANT parallel to examples like (10), here repeated as (36), for other modals (cf. Doherty 1985:199f, Diewald 1993, 1999, Abraham 2001), this view is not adopted by e.g. Palmer (2001:9,15), and has also been further challenged by several recent works (Fagan 2001, Reis 2001:289, Schenner 2007).

(35)	Sie	will	einen	Apfel	gegessen	haben.
	she	WANT-3s	an	apple	eaten	have

'She claims to have eaten an apple.'
$S,R_M \bullet R_M,E_M \mid E_M,R_E \bullet E_E\_R_E$

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[41] As mentioned above, the future particles stemming from WANT in Greek and English are invariable. The Romanian future auxiliary appears only in a paradigm originally stemming from the present tense form of WANT. In German, the future auxiliary *werden* does inflect, but also only in the forms *werde* (1s), *wirst* (2s), *wird* (3s), *werden* (1/2/3s). Forms like the infinitive *werden*, the participles *geworden* and *werdend* belong to the paradigm of the telic verb of transition *werden* ‘to become’ and not to the future auxiliary. Like epistemic modals (cf. also Diewald 1993, 1999), the future auxiliary cannot appear in the infinitive etc.:
(i) A: Morgen wird er abreisen.
B: a. Das Abreisen kann er vergessen.
b. *Das Abreisen-Werden kann er vergessen.
Compare instead the use of evidential WANT in section 4.2 and Remberger (forthcoming).

(36) Hans muss gestern gearbeitet haben.
H. MUST-3s yesterday worked have
'H. must have worked yesterday.'
$S,R_M|$ Anchor$=R_M,R_E \bullet E_E_R_E$ with E_E/R_E_S (*gestern*)

Furthermore Remberger (forthcoming) shows that several tests for the epistemic use of modals are not applicable to the evidential use of WANT. The criteria valid for the epistemic interpretation of modals (in German[42]) are the following ones (cf. also Diewald 1993, 1999, Abraham 2001):

(37) Epistemic modals
a. show a non-finiteness gap: they do not appear in non-finite forms;
b. they cannot appear in the company of another epistemic modal;
c. they do not participate in word formation processes;
d. they require a simultaneous linking for the complement's T1;
e. they cannot appear in compound tenses or in the future tense;
f. their complement cannot be pronominalised by an *es*-form.

Only (37d-f) (cf. also Gergel/Hartmann 2006), but not (37a-c) (cf. Remberger forthcoming for some examples), are also obligatory in evidential WANT-constructions: the time-relational structure of evidential WANT-constructions corresponds to that of epistemics (cf. (37d) and (37e)); the impossibility of pronominalisation (cf. (37f)) shows that with epistemic as well as with evidential constructions we might have a reduced, but still complex syntactic structure, and that the embedded infinitive is not a constituent of its own (different from complements of illocutionary verbs, cf. Remberger forthcoming). But the correspondence ends here: even semantically, an evidential WANT-construction cannot be claimed to be epistemic in the sense of a modal base individually anchored to the speaker, i.e. the speaker's (incomplete) knowledge (and thus uncertainty). The only modal base directly anchored to the speaker in an evidential WANT-construction is a realistic modal base. The modal base introduced by WANT is instead still individually anchored to the subject. However, it is not an epistemic base, encoding the knowledge worlds of the syntactic subject, but a modal base of reported speech (cf. Quer 1998[43]). Thus in an evidential WANT-construction it is indicated that the source of information for the proposition p is an act of speech performed by the syntactic subject. Any flavour of disbelief or uncertainty concerning the truth of the proposition is purely pragmatic, i.e. an implicature: German is not a language that obligatorily needs to encode evidentiality and thus the explicit marking of a source of evidence like in the evidential WANT-constructions leads the hearer to believe that the speaker is not sure about what was said, i.e. if p or not p. However, this pragmatic implicature can be made explicit (or defied) in evidential WANT-constructions, whereas this would be impossible with a true epistemic modal (cf. also Ehrich 2001:157):

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[42] Not all criteria given in (37) are valid for other languages, cf. e.g. Spanish, where epistemic modals can be found in all kind of tenses, even perfective (cf. Laca 2006).

[43] Quer (1998:160) refers to a modal base of "reported conversation MRC(x) introduced by 'say' or 'claim', where the individual anchor is identified with the referent of the subject of the verb of saying."

(38) Hans muss gestern gearbeitet haben, *aber das glaube ich nicht.
H. MUST-3s yesterday worked have but this believe I not
'H. must have worked yesterday, but I don’t believe it.'

(39) Hans will gestern gearbeitet haben, aber das glaube ich nicht.
H. WANT-3s yesterday worked have but this believe I not
'H. claims to have worked yesterday, but I don’t believe it.'

Even the English translation of (38) is odd, but (39) is perfect. Nevertheless, one cannot say that there is no epistemic shift for WANT at all. In colloquial English, e.g. the following example from Verplaetse (2003), where WANT seems to have the semantics of an epistemic modal, was found:[44]

(40) "Do you have coolers?" "Coolers? They wanna be on one of the top shelves somewhere."
(Verplaetse 2003:158)

Moreover, in the preceding section, I have claimed that an epistemic use of WANT is found in its diachronic development towards grammaticalisation as a future marker in languages that have a WANT-future.

As for the evidential shift of WANT, it seems to be a development peculiar to German. Note that examples like (41a) from Spanish and (42a) from Italian, languages that are both known to have an epistemic use of their modals, are ungrammatical:

(41) Pedro tiene solo quince años, pero... (Laca 2008:115)
P. has only 15 years but
a. ...#quiere haber alcanzado ya la mayoría de edad.
A. WANT-3s have reached already the majority of age
b. ...querría haber alcanzado ya la mayoría de edad.
A. WANT-COND.3s have reached already the majority of age

(42) a. *Gianni vuole aver lavorato ieri.
G. WANT-3s have worked yesterday
b. Gianni vorrebbe aver lavorato ieri.
G. WANT-COND.3s have worked yesterday
'G. would like to have worked yesterday'

Since in Spanish and Italian, there is no grammaticalised evidential shift, the only way to save sentences like (41a) and (42b) is to mark them as counterfactuals by the use of the conditional[45], as in (41b) and (42b). No evidential interpretation is achieved in any case.[46]

Parallel to the epistemic modal constructions, evidential WANT can be used in the past, cf. (43)[47], but not in a compound tense, cf. (44). That means that the second time-relation T2 of the matrix clause cannot be realised in these sentences.

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[44] Note that, in this example, *wanna* could be easily substituted by epistemic *will*, the former volitional modal and now future auxiliary.

[45] The morphology of the conditional has the role of introducing a non-realistic modal base, i.e. one that excludes the actual world (cf. Laca 2008).

[46] For other constructions with WANT that apparently do have an evidential meaning in Italian and French, cf. Remberger (forthcoming).

[47] Examples like that are not extremely frequent in German, but can be found, cf. (i) from COSMAS (bmp):

(43) Anna wollte ihn gesehen haben.
A. WANT-PAST.3S him seen have
'A. claimed to have seen him.'
$R_M\_S \bullet R_M,E_M \mid E_M,R_E \bullet E_E\_R_E$ (evidential)[48]

(44) *Anna hat ihn gesehen haben wollen.
A. has him seen have WANT-PART/INF
$S,R_M \bullet E_M\_R_M \mid E_M,R_E \bullet E_E\_R_E$ (*evidential)[49]

The new development in German, which is only found in texts from the 16th century onwards (cf. Diewald 1999:428), is clearly related to a grammaticalisation process. That does not mean that WANT has become an evidential marker in the sense of a grammatical morpheme following Aikhenvald (2004), but nevertheless the evidential use of WANT can appear only in certain constructions and in certain time-relational contexts. In what follows, a derivation parallel to the epistemic shift of other modals will be proposed, but with some important differences: The modal base is not epistemic and thus not linked to the speaker, but it is one of reported speech which is still linked to the syntactic subject of the construction. Thus one of the most prominent properties of WANT, the one that distinguishes it fundamentally from most of the other modals, its subject-linking property, is maintained in evidential WANT-constructions in German. The derivation goes as follows:

(45) Hans will gestern gearbeitet haben.
H. WANT-3s yesterday worked have
'H. claims to have worked yesterday.'
a. #$S,R_M \bullet R_M,E_M \mid$ Anchor=$E_M\_R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
b. #$S,R_M \bullet R_M,E_M \mid$ Anchor=$E_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
c. $S,R_M \bullet R_M,\cancel{E_M} \mid$ ~~Anchor=~~$\cancel{E_M},R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)
d. $S,R_M \mid$ Anchor=$R_M,R_E \bullet E_E\_R_E$ with E_E/R_E_S (*gestern*)

The interpretation of (45a) with an posterior anchoring to the matrix clause is nearly always incompatible[50] with the time adverbial *gestern* 'yesterday', but so is (45b), at least with a

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(i) Von der Leiche, die nur wenige Meter neben dem Fahrrad gelegen hatte, wollten die beiden jedoch nichts gesehen haben.
'However, they both claimed not to have seen the dead body, which had been lying only a few metres from the bicycle.'

[48] With WANT in the imperfect, the deontic reading is also possible:
'A. had to have seen him.'
$R_M\_S \bullet R_M,E_M \mid E_M\_R_E \bullet E_E\_R_E$ (deontic)

[49] The deontic reading is again not possible in this case (cf. also (13) and fn. 14):
$S,R_M \bullet E_M\_R_M \mid E_M\_R_E \bullet E_E\_R_E$ (*deontic)
The construction could be rescued by counterfactuality, i.e. by a conditional form:
(i) Anna hätte ihn gesehen haben wollen.
A. had-COND him seen have want-PART/INF
'A. would have liked to have seen him.'

[50] But see fn. 23 for the pragmatically marked readings, which are possible with WANT, too:
(i) $E_E\_S,R_M,E_M\_R_E$
(ii) E_E_S,R_M,E_M,R_E
(iii) Context for (i): the monthly meeting of our company is in two days. Everybody wants to have worked on certain days. By then (=R_E), I want to have worked today; and John

volitional interpretation: volitionality is a special case of deontic modality and the time-relational situation of (45b) still somehow contradicts the non-anterior restriction of deontic modals, at least in the pragmatically non marked configuration with $E_E\_R_E$ preceded by S (= (45)), when *gestern* R_E/E_R_S would again necessarily result in a solution of E_M/R_E in $R_E\_E_M$ which is the forbidden relation. Furthermore, there is no overtly realised T2 in the matrix clause. I assume that there is also a cancellation of the event situation with evidential constructions, in this case the moment of volition of the subject. Thus the modal evaluation time is shifted from E_M to R_M, which is only possible because the relation between E_M and R_M is unmarked, i.e. E_M,R_M. WANT has been shown to have a bouletic and in some cases also an epistemic modal base, both connected to the subject. The deontic bouletic modal base is no longer valid due to the cancellation of the matrix event situation. The epistemic modal base takes over, but the knowledge-world is then still individually anchored to the subject. This could be paraphrased by the conversational background "As far as the subject knows...". It is clear that the speaker can only know what the subject knows if the subject has made her or his knowledge implicit in an illocutionary act. Thus, the modal base of evidential WANT is one of Reported Speech with a clear indication of the source, namely the subject of the predicate of the embedded infinitive.

WANT is not a fully grammaticalised evidentiality marker in the data discussed in this section. But WANT is not a lexical illocutionary verb like *behaupten* 'claim' or *sagen* 'say' either, since in its evidential use it is restricted to certain time-relational environments (cf. also Remberger forthcoming). In any case, there is a modal base of reported speech present in the structure, which can be made explicit like the modal bases in other modal constructions, cf. the adverb *angeblich* 'allegedly' or the adjunct clause *so sagt er* 'so he says' in (46):

(46)	a.	Hans	will	gestern	angeblich	gearbeitet	haben.		
		H.	WANT-3s	yesterday	allegedly	worked	have		
		'H. claims to have worked yesterday, allegedly.'							
	b.	Hans	will	gestern	gearbeitet	haben,	so	sagt	er.
		H.	WANT-3s	yesterday	worked	have	so	says	he
		'H. claims to have worked yesterday, so he says.'							

This modal base of reported speech can be called illocutionary and therefore I will call *wollen* in the evidential WANT-constructions peculiar to German an *illocutionary modal*.

5. Conclusions

In this paper, two tense-related phenomena with respect to the prototypical verb WANT have been analysed. One is the grammaticalisation process towards a future auxiliary, which is found in languages like Romanian, Greek and also English (cf. section 4.1). The other is restricted to German and consists of an evidential interpretation of WANT in cer-

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wants to have worked yesterday [= *Hans will gestern gearbeitet haben* – with a volitional reading].

tain time-relational configurations (cf. section 4.2). Both phenomena have been analysed by adopting a compositional analysis that takes a biclausal structure with two temporal relations for each clause as the basic template for all types of modal constructions. The WANT-constructions discussed here differ from other modal constructions principally in two principal ways, namely the modal base and its individual anchor. The results of this analysis are given in table (47):

(47) Time-relational properties of modal and WANT-constructions

	Type	**Time-relational anchoring**	**Modal base**	**Individual anchor**	**Status**	**Modal relation**
(a)	deontic modals	$E_M\_R_E$ (E_M,R_E)	deontic	context	root modal	poss./ nec.
(b)	epistemic modals	E_M,R_E	epistemic	speaker	epistemic modal	poss./ nec.
(c)	volitional WANT	$E_M\_R_E$ (E_M,R_E)	deontic-bouletic (epistemic)	subject	root modal	nec.
(d)	evidential WANT	E_M,R_E	reported	subject	illocutionary modal	nec.
(e)	future WANT	$E_M\_R_E$ / S_R • R,E	epistemic/ realistic	speaker	auxiliary	**---**

The table shows that volitional WANT and other deontic modals correspond in their time-relational anchoring, as do evidential WANT and epistemic modals. Yet, whereas volitional WANT and other deontic modals can be called root modals – but linked to a sentence internal argument with WANT and to the context with the other modals –, the modal bases of epistemic modals vs. evidential WANT are quite different. WANT is peculiar since it maintains its subject-linking property even in the evidential use, where the subject is the individual anchor for a modal base of reported conversation. The modal base and its individual anchoring can be more easily compared in epistemic modals and the WANT-future, at least at an earlier stage of its grammaticalisation process, where there was still an obvious modal meaning. At the end of the grammaticalisation process, however, there is tense instead of modality, which clearly developed out of a posterior time-relational anchoring.

To sum up again: epistemic modals are comparable to future WANT insofar as the individual anchor of the modal base has – for future WANT only at an initial stage, before the modal meaning is substituted by a realistic interpretation – an epistemic modal base with its individual anchor in the speaker. The individual anchor of a deontic-bouletic and/or epistemic modal base for volitional WANT and that of a modal base of reported speech for evidential WANT are both connected to the external argument of the clause. Deontic modals and volitional WANT rely on the same time-relational structure as epistemic modals and evidential WANT respectively, which exhibit a reduced but still somehow biclausal structure. A future reading of WANT instead exhibits a strictly reduced monoclausal structure.

More phenomena related to times and time contours (i.e. aspect), could have been discussed here and integrated in the table above. One phenomenon, for example, would be the conditional shift mentioned above where counterfactuality can rescue otherwise compositionally incompatible meanings. Another would be the actuality shift noted by Hacquardt (2006) and others (cf. the so-called implicative reading in Laca 2006) as given in (48) for

Italian, where with the modal in the past perfect a factual reading is reached, and which should be further explored within the tense-aspect systems of other languages too:

(48) Italian: Lizzie ha voluto parlare a Darcy,#ma non gli ha parlato.
L. has WANT-past.3s talk to D. but not to-him she-has talked
'Lizzie wanted to (and did) talk to D., #but she didn't talk to him.'

The conditional shift and the actuality shift are probably phenomena related to the interaction with tense of all modal constructions and not only of the peculiar verb WANT. In any case, both shall be explored in future work.

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Imperatives and Tense

1. Introduction

At sentence level, many of the world's languages distinguish not only the form types of declarative and interrogative clauses with their canonical function of asserting and questioning, but also imperatives, which are often used for ordering or requesting (cf. Sadock/Zwicky 1985):

(1) a. You are nice to Auntie.
    b. Are you nice to Auntie?
    c. Be nice to Auntie.

Nevertheless (just as with declaratives), many other speech act types are possible as well:[1] e.g., imperatives are used for giving advice (cf. 2a), expressing wishes or curses (cf. 2b,c), and even for giving permission (cf. 2d).

(2) a. A: How do I get to Harlem? – B: Take the A-train.
    b. Get well soon!
    c. Go to hell!
    d. Take an apple if you like!

It is not easy to devise a semantics that is on the one hand compatible with this functional pluriformity, and, on the other hand, for individual imperative occurrences, helps to explain why they get associated with a particular function. At the same time, imperatives are not related in any straightforward way to a truth value or a particular informational unit, the two pivots of static or dynamic denotational semantics. In view of these challenges, while it is standardly assumed that declaratives denote propositions, and interrogatives denote either sets of propositions (Hamblin 1976, Karttunen 1977) or index dependent propositions (Groenendijk/Stokhof 1984), a standard semantics for imperatives has not yet been established.

Imperatives also differ from the other two main clause-types in that, cross-linguistically, the main verb (the imperative verb) is often morphologically meagre. In many languages, it lacks at least some temporal or aspectual oppositions encoded by other (finite) forms, or it is even just a verbal root. In addition to the apparent lack of a truth-value, this has sometimes been taken as evidence that imperatives do not allow for anchoring with respect to a particular index of evaluation in general, or are at least severely deficient with respect to temporality. In this spirit, Huntley (1980) claims that imperatives express unanchored propositions; Platzack/Rosengren (1998) argue that, syntactically, imperatives correspond to CPs that lack TP, which leads to tense being absent in semantics, while future orientation is brought in by ‘directivity’ as associated with imperatives; similarly, Wratil (2005) argues that, in imperatives, CP and IP are fused into a projection called MoodP, while TP is absent and temporal interpretation is determined by ‘directivity’. In all of these accounts it is assumed that it is the speech act types of ordering, commanding, or requesting which bring in the future orientation that is perceived in the examples in (2).[2]

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[1] This holds true not only for English, but also for numerous other languages, in particular also for languages like German that display distinct imperative morphology on the verb.

In contrast to this semantic (and syntactic) parsimony, other approaches take it to be part of the semantic nature of imperatives that they update obligations or plans, and, in doing so, are strictly future oriented in their semantics (e.g. Zarnic 2002, Mastop 2005). Future orientation is also built into van Eijck's treatment of imperatives as denoting programs in propositional dynamic modal logic.

In this paper, I argue that a satisfactory semantic account of imperatives needs to explicitly represent temporality at the level of recursive semantics (cf. also Schwager 2006, Jensen t.a.). Nevertheless, the imperative semantics itself does not automatically enforce a strict future orientation; this is brought about as a property of speech act types like ordering or commanding. Consequently, imperatives used for other speech act types (e.g. advice, wish) are more flexible in their temporal orientation. Moreover, I will show that, in cases of quantificational adverbials, imperatives cannot be constrained to a strictly future oriented perspective. This pertains even to cases in which the imperative is used in a prototypical way, that is, as a command or request. To meet these requirements, I propose an analysis in terms of modalized propositions that is general enough to account for interaction with temporal adverbials, temporal quantification, and present perfect morphology in German.[3]

2. Imperatives, Modals and Temporality

2.1. There is still tense

Even if, in many languages of the world, imperatives do not express temporal oppositions, imperatives can easily co-occur with temporal adverbials that anchor them with respect to a particular interval[4] in time, relative to a particular event, or relative to the trace of an event that is quantified over:

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[2] In fact, it might not be indisputable that (2a-B) has a future orientation.

[3] I consider this possibility to interact rather freely with temporal information I consider a straightforward advantage of the modal approach over approaches that build future orientation into the semantics of the imperative. While those accounts may still appeal to pragmatic mechanisms to overwrite the particular effect, such amendments risk depleting the original appeal of plans or To Do Lists as bearing a specific role in the discourse settings. Yet, the goal of this paper cannot be an in-depth comparison between various approaches and possible amendments. Instead, I confine myself to point out the necessity of circumventing strict future orientation and show that the relevant data can be captured satisfactorily by the modal approach.

[4] Throughout the paper, I assume that temporal intervals can be instantaneous.

(3) a. Call me next Tuesday. *external anchoring*
b. Knock before entering! *relative anchoring*
c. Be waiting at the gate when she gets there. *relative anchoring*
d. Kiss her before every meeting! *quantification*

Such phenomena have been studied in detail for declaratives. The standard treatment adopts (covert) temporal expressions, e.g. temporal variables that can be related to particular instants of time, as well as to runtimes of events (if such entities are assumed to be part of the ontology, as I assume here; for details cf. e.g. von Stechow 2002a,b). In order to maintain a non ad-hoc, ideally compositional semantics for sentences as in (3), temporality needs to be represented in whatever semantic object is assigned to imperatives. In the following, I will show that an independently motivated semantics in terms of modalized propositions interacts in a straight-forward, compositional way with temporal modification, quantification, and negation.

2.2. Modalized propositions

In Schwager (2006), I have argued in detail that only an underspecified semantics is able to account for the pluriformity of usages that is observed with imperatives. At the same time, the semantics has to be specific enough to explain why certain functions remain strictly excluded (assertions, in particular), and why a particular imperative in a particular context is used for a particular conversational move, i.e., speech act type.

The starting point for my analysis of imperatives lies in the observation that modal verbs can be used performatively as well, as has been argued in detail by Kamp (1973,1978), Lewis (1979), van Rooy (2000), Schulz (2003), Ninan (2005). Most modal verbs can be used to describe a certain state of obligations, wishes, etc. – roughly, what is permissible (*descriptive modal verbs*), but they can also be used to change this situation w.r.t. such parameters, e.g. to enact a permission or a prohibition (*performative modal verbs*). Portner (2009) argues convincingly that the traditional label of *performative modal* should be weakened to include also usages of modalized propositions that behave non-assertorically without inducing actual change (e.g. modals used for giving advice). The difference between a descriptive and a performative reading for a the modal verb *may* in a sentence like (4) can be highlighted by the follow-ups in (4a) and (4b) respectively.

(4) You may take a pear.
a. ...At least according to what the guy in the uniform said.
b. ...But I won't allow you to take an apple!

In their performative usages, modal verbs are a lot like imperatives in that they do not seem to form semantic objects that bear a truth value. Consider *must*, which according to Ninan (2005) is always used performatively when appearing in matrix sentences, cf. (5).

(5) A: You must eat a pear. – B: #That's not true, I don't.

Given this parallelism, I assume that imperatives denote the same sort of semantic object as is expressed by a sentence containing a modal verb that is used performatively. Therefore, first, we need to settle the issue of whether performative and descriptive modal verbs correspond to the same semantic objects. Kamp (1978) and Schulz (2003) provide convincing arguments that they do.[5] According to this view, the modalized sentences denote propositions that, under particular contextual constellations, can obtain non-assertoric effects in the above deontic sense (enacting a permission or a prohibition), but also in giving advice or in expressing a wish. For the different usages of imperatives we can now draw on the well-known context dependence of modal verbs (cf. Kratzer 1978).

(6) You have to be well soon! (*according to what I want/according to what is necessary for us to go on vacation next week/according to what I infer from the doctors' behaviour/...*)

But, of course, we have to block imperatives from ever being used descriptively. For modal verbs, I assume that the difference of performative vs. descriptive use depends on the contextual setting. Therefore, the felicitous use of imperatives has to be constrained to exactly those contexts in which the corresponding proposition encoded by a modal verb could have obtained a performative use. This will be ensured by an additional presuppositional meaning component introduced in the imperative clause type. Once this is in place, we obtain a very natural interaction with the phenomena in the realm of temporality. At the same time, the similarity in the behaviour of imperatives and modal verbs as far as temporality is concerned supports the independently motivated modal operator approach to imperatives.

In general, modal verbs come with two types of temporal information. They express what is entailed by, or compatible with, a particular body of information (the *modal background*; to be modeled as a set of possible worlds). But this modal background is time dependent in two ways. Consider (7): First, the relevant background for necessity/possibility is considered at a particular interval. I will call this the *tense time* (cf. Musan 2000). E.g. in (7a), this is the utterance time c_T, in (7b), it is some moment t that precedes the utterance time.

(7) a. Hedde has to call Joe. (*w.r.t. the manager's wishes at* c_T)
b. Hedde had to call Joe. (*w.r.t. the manager's wishes at t preceding* c_T)

Second, the event/state claimed to be necessary/possible w.r.t. the modal background is located at a temporal interval (possibly world dependent); I will call this the *event frame* (at each world w in the background, the time t' s.t. the required call is happening). In particular, it has been observed that event frames of stative predicates tend to overlap the tense time, whereas event frames for non-stative predicates tend to follow tense time (cf. Abusch 1997, Condoravdi 2002).

(8) a. Shin-Sook has to be there right now. *stative; overlaps*
b. Shin-Sook has to go there tomorrow. *non-stative; follows*

At first glance, imperatives seem to differ in that the tense time is invariably equivalent to the utterance time, and that the event time is invariably future, even with stative predicates, which require saliency of an interval t that can serve as the event time.

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[5] Cf. Kamp (1973), Merin (1992), and van Rooy (2000) for the opposed view, that is, an analysis in terms of ambiguity.

(9) a. Call me!
ok: w.r.t. my wishes at c_T
not: w.r.t. my wishes at some $t < c_T$
b. Be waiting at the gate #(when she gets there).

Yet, we will see that at least in Dutch and in colloquial German, imperative modality can combine with non-present tense times; moreover, some North American Indian languages provide evidence for specification of the event frame as immediately abutting c_T or being located at some point in the future of c_T (cf. section 4.1). Last but not least, quantificational adverbials in German make it necessary to allow for an event frame that properly contains c_T . Aspectual morphology, like the present perfect in German, will also be shown to affect the event frame. Crucially, the restriction to a future event frame will be revealed to constitute a property of particular speech act types. Imperatives used for other purposes (wishes, in particular) will be shown to be more liberal.

I take these phenomena to constitute good evidence that indeed both types of temporal dependence play a role in imperatives, and consequently that the modal operator analysis for imperatives is on the right track.

2.4. Imperatives as modal operators

In the following, I will apply the standard semantics for modality in natural language (Kratzer 1991) to imperatives, taking into account temporal information. I assume that there is a set of possible worlds W which come with their entire histories, and a set of temporal intervals T that come with a partial order $\leq$ expressing temporal precedence.

Semantically, modal verbs combine with a proposition and express that this proposition is entailed by, or compatible with, a contextually given set of possible worlds (the *modal background*). Depending on the context of interpretation, this modal background represents what is commanded (*deontic modality*), what is needed in order to reach a particular goal (*teleological modality*), or what is wanted (*bouletic modality*).[6] Following von Fintel/ Iatridou (2005), the relevant set of worlds is introduced by a covert pronoun present in the syntactic structure (the first argument of the modal verb) that stands for a function from indices (worlds and times) to sets of propositions. Depending on the particular variable assignment g, $[[H]]^{c,g} = g(H)$ can, for example, be any of $H_{c\text{-}S\text{-}deontic}$, $H_{c\text{-}S\text{-}bouletic}$, or $H_{c\text{-}A\text{-}teleo}$ where for each world w and time t:

(9) $H_{c\text{-}S\text{-}deontic}(w,t) = \{w' | \forall p[\text{c-speaker commands p at t in w} \rightarrow p(w')]\}$
$H_{c\text{-}S\text{-}bouletic}(w,t) = \{w' | \neg\exists w''[\text{of the wishes c-speaker has in w at t,}$
$\text{w'' verifies all those that w' verifies plus at least one more}]\}$
$H_{c\text{-}A\text{-}teleo}(w,t) = \{w' | \forall p[\text{p is a goal of c-addressee at t in w} \rightarrow p(w')]\}$

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[6] Resorting to a simple function from indices to sets of worlds is a gross simplification. As in Kratzer (1991) the modal background should result from the combination of a modal base (fetching the worlds to be considered) and an ordering source given by preferences or stereotypes (narrowing down the set of worlds given by the modal base to a set of relatively best ones). Teleological modality may involve even more parameters, cf. von Fintel/Iatridou (2005). Cf. Schwager (2006) for an analysis of imperatives in terms of modal bases and ordering sources.

The (standard) interpretation of a modal verb like German *muss* `must' is given in (10).

(10) $[\![\ \text{muss}\ ]\!]^{c,g} = \lambda H\ \lambda p\ \lambda t\ \lambda w.\ \forall w' \in H(w,t)[p(w')]$

Furthermore, I assume that imperative clauses contain a covert modal element IMPMOD, which is syntactically required to license the modal information on the imperative verb. At the propositional level, IMPMOD is interpreted exactly like *muss* in (10). Nevertheless, IMPMOD is constrained to performative usages only. To account for this, I assume that IMPMOD (but not German *muss*) comes with an additional presuppositional meaning component which requires in particular that the speaker be an (epistemic) authority on the background in question. Moreover, since imperatives are 'realistic' (indicative modals), the modal background has to constitute a subset of the worlds compatible with mutual joint knowledge of the interlocutors in the conversation in context c (the *Common Ground* of c, CG(c); cf. Stalnaker 1978).

(11) a. $[\![\text{IMPMOD}]\!]^{c,g} = \lambda H\ \lambda p\ \lambda t\ \lambda w.\ \forall w' \in H(w,t)[p(w') = 1.]$,
presuppositions: authority(the speaker, H, c),
$H(w,t)\ \text{č}\ CG(c)$.
b. x is an authority on H in c (abbreviated as ‚authority(x,H,c)') $\leftrightarrow$
$\forall(w,t)\ \text{č}\ CG(c)[(w',t') \in Dox(x,w,t)[H(w',t') = H(w,t)]]$,
where Dox_x assigns to (w,t) the set of indices (w',t') compatible with x's beliefs at w, t

Why should epistemic authority ensure a performative effect? Assume someone issues an imperative *Call me!* (e.g. as a request), that is, she expresses the proposition *that in view of what I request, it is necessary that you call me*. Normally, unless there is a metalinguistic interest, we assume that speakers believe in the propositions they express in the conversation (e.g., this is part of asserting a declarative). Now, in this case, either her utterance itself is a request that makes the proposition true, or, the proposition is false – given that we take the speaker to believe in the truth of her propositions, the authority condition would be violated. Hence, imperatives are either true or violate authority. Now, nearly every context is such that for any individual x, authority(x,H,c) is met for H = *what x orders/what x wishes/what x requests,...* . We tend to assume that individuals know what they order, request or wish. A case where this is not born out with would be a case in which someone tries to command things she is not actually entitled to command: in such situations, the speaker tries to command something, but given a failure of social authority, does not actually command it (and the addressee is aware of this). Hence, the proposition expressed is false. Still, the imperative cannot be refuted by *That's not true*, but will be refuted by something like *You have no right to tell me so!*. This is predicted by the fact that such a case comes out as a presupposition failure. At the same time, a reply like *True indeed!* feels inappropriate in response to an utterance that is meant to give a command. I take this to be a pragmatic effect. The main interest of the speech act executed is not to give information about the truth of the proposition, but rather to get the addressee to behave in accordance with the imperative. Note that a reply like *True indeed!* becomes a lot better in reply to an imperative that serves to give advice, as evidenced by the following exchange in German.[7]

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[7] Throughout the paper, in the glosses I use the following abbreviations: IMP (imperative), INF (infinitive), PRT (temporal, aspectual, or discourse particle), V-PRT (verbal particle).

(12) A: Um nach Hanau zu fahren, nimm am besten den Zug Richtung Hamburg.
to to Hanaou to go.Inf, take.Imp at best the train direction Hamburg
'To go to Hanau, take the train in direction Hamburg.'
B: Stimmt./Das ist wahr./Das ist richtig. (Daran hatte ich nicht gedacht.)
Right./That's true./That's correct. (I hadn't thought of that.)

Schwager (2006) shows that the requirement of speaker authority has to be backed by three additional requirements that ensure (i) that the background H be related to preferences (instead of stereotypes, etc.; similarly, in a non-propositional account, Portner's (2007) restriction to dynamic modality); (ii) the speaker is assumed to consider the propositional complement epistemically possible, but not necessary, and (iii), the speaker affirms the preferences underlying H as a good guideline for acting (he is presupposed to assent to something like *I consider it good if you realize my wishes/my commands/your goals/...*- depending on the value assigned to parameter H).

Note that, in general, constraints on the contextually supplied value for H are widely accepted to account for the fact that different modal elements are restricted to different sorts of modality. E.g. English *can* is open to epistemic, deontic, and teleological sorts of modality, but *might* is restricted to epistemic modality; German *darf* is constrained to deontic or teleological possibility, its subjunctive *dürfte* has an additional, independent use as (weak) epistemic necessity, and many more (cf. Kratzer 1981).

3. Tensing Imperatives

I adopt a deictic theory of tense (cf. Partee 1973, von Stechow 2003) and assume that morphological tense is normally interpreted as inducing a restriction on the time of evaluation (cf. von Stechow 2005 for a discussion of the syntax-semantics interface).

(13) a. $[\![\textsc{Pres}_i]\!] = g(i)$, if $g(i) = c_T$, else undefined.
b. $[\![\textsc{Past}_i]\!] = g(i)$, if $g(i) < c_T$, else undefined.

VPs are properties of events or states and get located with respect to the time of evaluation by aspect (cf. Klein 1994, von Stechow 2003).

(14) a. $[\![\textsc{Pfv}]\!]^{c,g} = \lambda P\, \lambda t\, \lambda w.\, \exists e[\tau(e) \subseteq t\ \&\ P(w)(e)]$
b. $[\![\textsc{Impfv}]\!]^{c,g} = \lambda P\, \lambda t\, \lambda w.\, \exists e[t \subseteq \tau(e)\ \&\ P(w)(e)]$

A simple declarative as in (15a) has an LF as in (15b) and gets interpreted as in (15c).

(15) a. You called Melli.
b. $[_{CP}\ [_{TP}\ \textsc{Past}_i\ [\ _{AspP}\ \textsc{Pfv}\ [_{VP}$ you [call Melli]]]]]
c. $[\![(15b)]\!]^{g,c} = \lambda\, w.e[\exists\ (e) \subseteq g(i)$ & e is an event of you calling Melli in w]
if $g(i) < c_T$; else undefined.

Normally, imperative clauses speak of what is permissible/obligatory/recommended/ wanted/... in the utterance context, hence they are like present tense modals.

Imperative subjects are always tied to the addressee. Following Wratil (2005) I assume that, in the absence of an overt second person subject pronoun, the subject position is occupied by a covert pronoun IMPPRO which is interpreted as referring to the addressee (this can be mediated by person agreement features to be checked in a corresponding functional position[8]. In the following I will just write *you*. Up to AspP, apart from the fact that the subject need not be realized overtly, the imperative looks just like the corresponding declarative. Above AspP, we find IMPMOD, and PRES (instead of PAST); the presence of both is required syntactically by the features on the morphological imperative.

(16) a. Call Melli!
b. [$_{CP}$ [$_{TP}$ PAST$_i$ [IMPMOD [$_{AspP}$ PFV [$_{VP}$ you [call Melli]]]

So far, we have not said anything about the event time. In general, the event referred to in an imperative has to occur at an interval after c_T. In this, imperatives are again exactly like their modal verb relatives:

(17) a. Call Melli tomorrow/*yesterday!
b. You can/must call Melli tomorrow/*yesterday.

Hence, the two can be treated similarly. von Stechow (2005) discusses two possibilities to account for the forward shift with modal verbs. Either the modal verb allows for the insertion of a covert relative future tense that, for some/each of the accessible worlds, asserts the existence of an interval after the tense time of the modal (which is compatible with a future adverbial, but incompatible with a past adverbial). Or, we can follow Condoravdi (2002) and let the modal itself induce a forward expansion of the modal’s tense time. Therefore, the event frame is constituted by the future from c_T on, which is the interval [c_T,_), which expands from c_T (infinitely) into the future. For the imperative modal, the entry spells out as in (19). Note that this corresponds to the future restriction of the action space for imperatives as envisaged e.g. by Portner (1997) and Mastop (2005).

(18) *preliminary*:
[[IMPMOD]]^{c,g} = λH$_{<s,st>}$ λP$_{<i,st>}$ λt λw$_s$. ∀w’ č H(w,t)[P([t,_))(w’)]

Under the assumption that relevance constrains the event to happen in the near future rather than the distant future, the result for a simple imperative like (16a), given in (19), is satisfactory:

(19) [[[PRES [[IMPMOD H] [PFV [you call Melli]]]]^{c,g} =
[[IMPMOD]]^{c,g}(g(H))([[PFV]]^{c,g}(λe. λw.call-melli(c_A)(e)(w))](c$_T$) =
λẉ. ∀w’ ∈ g(H)(w, c_T)[∃e[τ(e) ⊆ [c_T,_) & e is an event of you calling M. in w’]

If the event frame is modified by an overt adverbial, as in (17a), we need to pick out the relevant subinterval of the event frame, e.g. by allowing it to modify the property of events expressed by the VP (via *Predicate Modification*). Everything else is as in (19).

(20) a. [[tomorrow]] ^{c,g} = λP$_{<i,st>.}$ λe. λw. τ(e) ⊆ the-day-after(c_T) & P(e).

---

[8] I assume that this is mediated by 2nd person-like agreement features on the morphological imperative. Examples like *Nobody move!* show that the requirement on the subject marking cannot simply be 2nd person (for a references and a detailed analysis, cf. Schwager (2006)),

b. $[\![\ [_{VP}\ [_{VP}$ you call Melli] tomorrow] $]\!]^{c,g}$ =
$\lambda e.\ \lambda w.\ \tau(e) \subseteq$ the-day-after(c_T) & you-call-melli(e).

Unfortunately, the account runs into problems in connection with quantification, negation, and imperfective aspect. All three problems pertain to imperatives and modals alike. I will focus on imperatives only, but my proposal extends to modal verbs as well.

For (18a), the adverbial modification constrains events happening in the future to events happening tomorrow. Given that all of tomorrow lies within the future, the adverbial picks out a subinterval of the event frame given by the imperative modal. But what happens if we take into account adverbials that pick out intervals that are not contained entirely within the future? Consider (21).

(21) a. Don't call Cecile while she is in Greece.
b. Don't call Cecile more than three times while she is in Greece.

Assume that we are right in the middle of a three week interval that Cecile spends in Greece. Intuitively, the imperative commands that this three week interval in total does not contain any/more than three phone calls of that particular type. E.g., if the addressee has already called Cecile on the day before the utterance, (21a) feels like an infelicitous command, given that it cannot be complied with anymore; (21b) amounts to allowing only two more calls to occur. Calls that have happened within the particular interval, but before c_T may not be ignored. In this, the imperative clearly differs from future tense (at least in German). (22) can only be verified by calls in the future:[9]

(22) Meine Mutter wird mich dreimal anrufen, während ich hier in der Küche bin.
my mother will me threetimes call.INF, while I here in the kitchen am
'My mother will call me three times while I am here in the kitchen.'

The only way to save the Condoravdi-style account would be to adopt a long stretched version of c_T that covers Cecile's entire stay in Greece. This conflicts with the assumption that c_T is punctual in English, which is often used to account for the incompatibility of the English simple present with eventive predicates. The idea is that the English morphological simple present is punctual, but perfective. Hence, it would require the inclusion of an entire event of going home into a punctual/minimal (in any case, too short) interval (e.g. von Stechow 2005).[10]

(23) #Ede goes home.

For German, stretching c_T would at least predict the present indicative to have the same reading. The facts are hard to test, because sentences like (24) immediately receive a modalized reading.

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[9] (25) is infelicitous if one or more calls have already happened in the part of my time in the kitchen that precedes the utterance. One has to insert the particle *noch* `more' and adjust the number to the number of calls that are still to happen. I assume that this requirement is an instance of *Maximize Presupposition* (cf. Heim 1991).

[10] Kaufmann (2005) offers an alternative account of the unacceptability of (23). His analysis is motivated by the availability of the English simple present for events that count as scheduled, as well as its occurrence in antecedents of indicative conditionals.

(24) Meine Mutter ruft mich (bestimmt) dreimal/nicht an, während ich hier in der
my mother calls me (for sure) threetimes/not V-PRT, while I here in the
Küche bin.
kitchen are
'(Given what her usual habits are, I'm sure that) my mother will call me three times/won't call me, while I am here in the kitchen.'

I am at least skeptical with respect to stretching c_T and will stick to the idea that c_T is very short.

Another problem arises with negation. Partee (1973) advocates a pronominal theory of tense (in contrast to the operator theory of tense), because no scopal order of quantificational PAST ('there is a t < t'') and negation derives the correct reading for (25a).

(25) I didn't turn of the stove.
a. 'There is a time t preceding the utterance time such that I didn't turn off the stove at t'. *too weak*
b. 'It is not the case that there is a time t preceding the utterance time and I turn off the stove at t.' *too strong*

The same holds for Condoravdi's theory of forward expansion. As far as I can tell, on her account, we can only derive the reading in (26a), which is clearly not what (26) means. The alternative theory of plugging in a covert relative future might in principle derive the alternative order (26b) as well, but this is equally unsatisfactory.

(26) Don't turn off the stove!
a. 'Don't ever turn off the stove!'
b. 'Don't turn off the stove all the time!'
(i.e. 'Let there be an interval at which you don't turn off the stove.')

Modern operator theories of tense (more or less tacitly) resort to additional contextual restrictions. Something like that would be needed for modals and imperatives as well.
Last but not least, our semantics for the imperfective aspect ends up expressing that an infinite stretch of time (namely, $[c_T,\_)$) is contained within the runtime of an event.[11]

(27) Be standing at the gate! *intended: when I come to pick you up*
$\lambda w_s.\ \forall w' \in g(H)(w, c_T)[\ \exists e[\tau(e) \supseteq [c_T,\_)$ & e is an event of you calling M. in w']

All three problems vanish if we take seriously the need for contextual restrictions arising from the operator theory. Given our deictic theory of tense, we can assume that the modal requires a further argument, which is an indication of when the event in question is to happen. I assume that the event frame is introduced by another temporal pronoun which is of (relative) non-past nature: it may not entirely precede the tense time of the modal. If the event frame could precede the utterance time, we would expect sentences like (28) to be acceptable.

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[11] Note that Condoravdi (2002) does not run into this problem. For her, stative VPs are anchored to the time of evaluation by the overlap relation. If imperfective aspect is assumed to act as a stativizer, the state expressed by the imperfective AspP is said to have a non-empty overlap with the future interval, which is of course unproblematic.

(28) #Geh da gestern hin.
go.IMP there yesterday V-PRT
'For all worlds accessible at c_T, within the salient event frame t, there is an event e of you going there and e happens yesterday.'

As it stands, our restriction that the event frame may not fully precede the utterance time does not account for the unacceptability of (28). If the event frame is long enough to span c_T and at least some time preceding the date line preceding c_T, it has a non-empty intersection with what counts as yesterday.[12] Hence, the embedded proposition becomes epistemically possible. One idea would be to relegate this problem to pragmatics and say that it is simply impossible to give commands that are to be verified in the past. If one cannot command something to happen in the past, a speaker who expresses that he commands something that happens in the past cannot express a true proposition and is violating authority and generating a presupposition failure. Unfortunately, the same grammaticality judgments hold for wishes (e.g. (29)); yet, wishes about what may have happened in the past are perfectly coherent (cf. section 4.4).

(29) *Sei gestern dort!
be.IMP yesterday there (for: 'I want you to have been there yesterday.')

A natural way out is to appeal to the context dependent nature of the silent event frame. I take it to be a pragmatic principle that one cannot make salient an event frame that is larger than a frame setting adverbial that is expressed overtly. Thus, expressing that an event is to happen within yesterday prevents an event frame that properly contains yesterday from being salient. Thereby, we require that t is contained within, or identical to, an overt frame setting adverbial rather than the other way round. This of course has implications for what are possible referents for (temporal) pronouns in general, which remains to be tested on larger grounds.

The resulting entry for the imperative modal is given in (30): after combining with the modal background (to be evaluated at tense time t and world of evaluation w), IMPMOD combines with the event frame t' and induces the presupposition that the event frame may not entirely precede the tense time t. Now the modal background is to be considered at the tense time t while the temporal predicate P expressed by the VP is predicated of the event frame t'.

(30) *Final version:*
$[[\text{ IMPMOD }]]^{c,g} = \lambda H_{<s,st>}\ \lambda t'\ \lambda P_{<i,st>}\ \lambda t\ \lambda w_s.\ \forall w' \in H(w,t)[P(t')(w')]$,
presuppositions: not $t > t'$,
authority(the speaker, H, c),
$H(w,t) \subseteq CG(c)$.

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[12] Musan (2002) builds on such a possibility to account for historical present tense. In her case, it would make problematic predictions if the historical present can appear with imperfective aspect, as in that case, the event would be required to be still going on at the utterance time.

4. A Cross-Linguistic View on Temporal Modification in Imperatives

The modal semantics for imperatives as spelt out in (30) opens up two main possibilities for temporal modification in imperatives: on the one hand, a language could allow for modification of the tense time (the interval at which the modal background is computed); on the other hand, a language could allow for modification of the event frame (the interval at which the event in question is supposed to take place).

4.1. Modifying the event frame

In his evaluation of temporal modifications in imperatives, Mastop (2005) discusses a distinction between imperatives for the remote and imperatives for the immediate future that has been reported for North American Indian languages. Mithun (1999) observes that Cheyenne encodes a contrast between imperatives that require the addressee to act in the near future (roughly, immediately after the imperative is issued) and imperatives that require the addressee to act at some later time. Similar effects have been reported for Maidu (Shipley 1964), and also for Tubatulabal and Takelma (cf. Wratil 2005 for discussion).

(31) a. méseestse (*Cheyenne*)
‘Eat!’
b. méseheo?o (*Cheyenne*)
‘Eat (later on)!’

On my account, such a distinction can be captured nicely in terms of restrictions on the event frame. For example, we can interpret the form in (31b) as carrying a restriction that its event frame does not abut the tense time c_T. In contrast, the form in (31a) either allows for an unrestricted event frame (relying on blocking to account for the difference to (31b)), or, the form in (31a) could itself carry a restriction that confines the event frame to overlap with/to a certain vicinity to the tense time. Unfortunately, the data need to be investigated in much more detail in order to decide what the actual restrictions are.

4.2. Tense time and event time in embedded imperatives in German and English

Thanks to the entry in (30), the semantics for the imperative modal interacts compositionally with the tense time (represented by the argument variable t). Consequently, we would in principle expect imperatives that come with past tense times. At first glance, this does not seem to happen. Like many other languages, e.g. German or English do not seem to allow for temporal oppositions with imperatives. Apparently, in these languages the temporal argument of IMPMOD is invariably filled by c_T (we can assume that the imperative verb is marked as present tense, just like a present tense form of a modal verb). The tense time of the imperative modal is thus the utterance time; what is relevant is what is commanded, recommended, wanted,... at c_T .

Nevertheless, even in such languages, this is not the only possibility. It has been observed that colloquial variants of both languages allow for rudimentary embedding of imperative clauses in speech reports (for German, Schwager 2006, Poschmann/Schwager 2008; for English, Crnic/Trinh 2008). Crnic/Trinh (2008) show that, in these cases, the presuppositions of the imperative modal assumed in Schwager (2006) have to be anchored to the embedding speech event reported in the matrix clause. But likewise, the temporal orientation is bound by the matrix context. In particular, the tense time is set to the time within yesterday at which the reported utterance took place. Consider (32), which is an example from colloquial German.[13] What is relevant is what I ordered yesterday, not what I might be ordering at utterance time. The felicity of a follow up like *but by now I don't think anymore that that's a good idea* shows that the tense time is truly past, that is, the commands need not be standing any more (as would be the case if this was some sort of a *double access* interpretation).

(32) Ich hab dir zwar gestern gesagt, geh da heute hin,
I have you PRT yesterday told, go.IMP there today V-PRT,
aber inzwischen denk ich nicht mehr, dass es eine gute Idee ist,
but in-the-meantime think I not anymore that it a good idea is,
there go-to.INF
da hinzugehen.
'I told you yesterday that you should go there, but in the meantime I don't think anymore that that's a good idea.'

Nevertheless, matters deteriorate if the event frame is shifted to past (this has been pointed out to me for similar cases in English by Pranav Anand, p.c.).

(33) *Ich hab dir zwar letzte Woche gesagt, geh da gestern hin,
I have you PRT yesterday told, go.IMP there yesterday V-PRT,
aber ich bin froh, dass du's nicht gemacht hast.
but I am happy that you-it not done have
'Last week, I did indeed tell you to go there (*yesterday), but I am happy that you haven't done it.'

On the modal operator account of imperatives, this is a natural result if we assume that the tense time is index dependent, but the event frame is context dependent. Even if the tense time is shifted to a moment before c_T, the event frame is still required to have a non-empty overlap with the time following c_T (instead of with the interval starting with tense time t, which, of course, properly includes the actual future $[c_T,\_)$).

4.3. Past tense times and irrealis imperatives for reproaches in Dutch

An entirely different argument in favor of the compositional interaction between modality and tense time in an imperative clause comes from Dutch pluperfect and past imperatives (cf. Beukema/Coopmans 1989, Mastop 2005). I will focus on the more productive pluperfect forms. They are formed with the auxiliary *zijn* `be' or *hebben* `have' in the past plus a past participle and express a reproach that the addressee did not perform an action in the past though he should have done so. The irrealis interpretation is ensured by presuppositional particles *toch, dan ook* (cf. Mastop 2005, his examples (14a,b)).

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[13] Not all speakers of German accept embedded imperatives of that sort. The parameters are not entirely clear to me, even though there is a higher acceptance among Southern speakers, neither regional provenience nor age of the speaker provide a clear cut distinction.

(34) a. Was toch naar huis gegaan toen Jan het foto-album opende.
was PRT to home gone when J. the photo-album open.PAST.SG
`You should have gone home when Jan opened the photo-album.'
b. Had je telefoonnummer dan ook nied aan di vent gegeven.
Had your phone-number PRT PRT not to that guy given
'You shouldn't have given your phone-number to that guy.'

Mastop (2005) argues that these are truly imperative because they occur with an implicit second person subject, and allow for particles that can only appear with second person, but are disallowed in constructions that are unambiguously optative. In terms of his analysis of updating plans, he suggests backshifting and updating a plan from a past perspective. According to him, it is the past participle that is responsible for the anteriority effect.

On the modal account, we can draw directly on the similarity to counterfactual readings for English subjunctive modals. Consider the two readings of (35):

(35) John might have won the race.
a. *epistemic:* `By now, John may have won the race.'
b. *counterfactual*: `at the salient time t (before c_T), it was still possible for John to win the race'

Condoravdi (2002) treats the two readings as a scopal ambiguity of PERF and MIGHT; her LF for the counterfactual reading (35b) and its interpretation are given in (36). Intuitively, the PERF-operator causes a back-shift to a time t at which there are still metaphysical alternatives (worlds with identical histories) of w which contain a winning of John at some point after t. The counterfactual interpretation is argued to arise from pragmatic considerations.

(36) a. [PRES [PERF [MIGHT [he win]]]]
b. $\lambda w.\ \exists w'\exists t[t < c_T \ \&\ w' \in H(w,t') \ \&\ \exists e[\text{he win}(w')(e) \ \&\ \tau(e) \subseteq [t,\_)]]$,
where H assigns to w and t' all worlds w'' that are metaphysically equivalent (agree on all facts) to w up to t'

Condoravdi points out that subjunctive modals can be outscoped by perfect, but indicative modals cannot. The difference is thus relegated to syntax. Given the explicitly indicative semantics we have assigned to IMPMOD in (30), for Dutch counterfactual pluperfect imperatives, outscoping by PAST has to go together with a removal of the requirement that the modal background pick out a subset of the actual common ground (e.g., those worlds in the common ground that are optimal according to my wishes/optimal according to my commands/etc.). In contrast to ordinary present tense imperatives, Dutch pluperfect imperatives compare realized and unrealized possibilities, hence they also consider worlds that are already excluded from the common ground at utterance time. To get this right, I assume that mood marking on modals is visible at the syntax-semantics interface, and in particular Dutch imperatives come in an indicative and a counterfactual variant.[14] Ordinary, indicative imperatives require their argument proposition to be possible with respect to CG, and require their modal background to be a subset of the common ground (all contributed by indicative IMPMOD as in (30)). Additionally, Dutch allows for counterfactual imperatives that require the presence of counterfactual $\text{IMPMOD}^{\text{+i-counter}}$. The correct LF can be ensured if counterfactual imperatives carry the uninterpretable features *[+u-impmod, +u-counter, +u-past]* which require the presence of their interpretable counterparts in the form of $\text{IMPMOD}^{\text{+i-count}}$, and a temporal pronoun PAST_i, giving rise to an LF as in (37) for (34b) .[15]

(37) [PAST [$\text{IMPMOD}^{\text{+i-counter}}$ H t] [you had not given the guy the number]]

Dutch $\text{IMPMOD}^{\text{+i-ind}}$ is just IMPMOD as we know it from languages that do not have the opposition (cf. (30)). $\text{IMPMOD}^{\text{+i-counter}}$ differs in that it requires a particular modal background $H_{\text{counter-cg}}$, and that the argument proposition of the imperative č w.P(t)(w) be incompatible with the common ground.

(38) a. $[[\ \text{IMPMOD}^{\text{+i-ind}}]]^{c,g} = \lambda H_{<s,st>}\ \lambda t'\ \lambda P_{<i,st>}\ \lambda t\ \lambda w_s.\ \forall w' \in H(w,t)[P(t')(w')]$,
presuppositions: (i) not $t > t'$,
(ii) authority(the speaker, H,c),
(iii) $H(w,t) \subseteq CG(c)$.
b. $[[\ \text{IMPMOD}^{\text{+i-counter}}]]^{c,g} = \lambda H_{<s,st>}\ \lambda t'\ \lambda P_{<i,st>}\ \lambda t\ \lambda w_s.\ \forall w' \in H(w,t)[P(t')(w')]$,
presuppositions: (i) not $t > t'$,
(ii) $H = H_{\text{count-cg}}$,
(iii) $CG(c) \cap \lambda w.P(t')(w) = \varnothing$.
c. $H_{\text{counter-cg}}(w,t) = \{w'|w'$ is optimal according to the addressee's goals
at w,t and w'' $\in$ CG[w'' and w' share the same history up to t]}

Due to the morphological marking of the Dutch pluperfect imperative, its tense time t can only be a past interval. This means that the modal background will be fetched (at the world of evaluation w) not at the utterance time c_T, but at the tense time t that precedes it. Moreover, the only modal background that is acceptable with the pluperfect imperative is the special modal background $H_{\text{counter-cg}}$ that assigns to each index (w,t) the set of worlds that are optimal w.r.t. the addressee's goals at (w,t), and, up to t, are identical to a world in the common ground. The imperative modal expresses that the argument proposition holds at all these t-historical alternatives to the CG that are optimal w.r.t. the addressee's goals at (w,t). Last but not least, the counterfactuality presupposition ensures that the imperative's coming true is incompatible with the common ground.

It is disputable if we want to call the resulting clause types imperatives, since by their grammatical nature they can never be used as commands (the suggested prototypical usage used for individuation of imperative clause types). We could easily individuate them as a related though distinct clause type of *reproachatives*. Yet, this issue is purely terminologyical: Dutch reproachatives contain IMPMOD but come with past tense marking. Hence, the tense time is set to past and the ordering source is evaluated there. Typically, a context will make the current judgments of the speaker w.r.t. such a previous point in time meet the authority condition.

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[14] Note that, surprising as this is, it is in line with imperatives containing covert modal verbs, instead of being on a par with mood marking in the sense of indicative, subjunctive, and counterfactual. So far, I have nothing to say on why in Dutch, less productive past and highly productive pluperfect forms alternate as the phonological realizations of counterfactual imperatives.

[15] I leave it open what is contributed by the auxiliary and what by the past participle (cf. Musan (2002) for detailed discussion with respect to the German perfect).

Note that the absence of past imperatives used as reproaches/reproachatives in (as it seems) most languages of the world is no more surprising than the fact that many modal verbs are also defective in their morphological paradigms in general, and in particular very often lack temporal oppositions as well (cf. Palmer 2001).

4.4 Imperatives and present perfect in German

In contrast to Dutch, imperatives in English and in German seem to be unambiguously present tense. Yet, they can participate in the formation of analytic tense or aspect forms that as a main auxiliary employ *haben* 'have`.[16]

For present tense imperatives, a use as wish follows immediately under the assumption of speaker bouletic modality.[17]

(39) a. Enjoy the film!
b. $\lambda \underset{.}{w}.\ \forall w' \in H(w,c_T)[\ \exists e[\tau(e) \subseteq t\ \&\ \text{you-enjoy-the-film}(w')(e)]$

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[16] Imperative formation is strictly impossible with the future auxiliary *werden*.
(i) a. Ich werde hingehen.
I will go-there.INF
b. *Werd hingehen!
will.IMP go-there.INF
This may be due to the modal nature of future *werden*. Passive auxiliary *werden* is compatible with the formation of imperative clauses, even if the resulting forms are idiosyncratic in use. Depending on particles we obtain wishes (ii-a) and, with contrastive subject pronoun, ironic suggestions to make a particular experience (ii-b).
(ii) a. Werd bitte bloß nicht von einem Haifisch gebissen!
get.IMP please PRT not by a shark bitten
`Don't you please get bitten by a shark!'
b. Werd du mal von einem Haifisch gebissen!
AUX.IMP you PRT by a shark bitten!
(*I'd like to see what you say after having made this experience*)
Obviously, passive *werden*, but not future *werden*, possesses a morphological imperative. Again, this difference w.r.t. gaps in the paradigm is not confined to imperatives: while passive *werden* does have an infinitive, future *werden* does not.

[17] In general, bouletic interpretations are harder to get than deontic or teleological ones. I take this to be due to the following: for a bouletic interpretation, the background is constituted by the speaker's wishes; thanks to the presuppositional meaning component that the speaker is an authority w.r.t. what he whishes and takes his wishes to be a good guideline for action, to express a wish that p become true (qua them being the modal basis of an imperative) to be a good guideline for action, is to indicate that the addressee is to make p true. Therefore, a reading as a command or request results. Only propositions that clearly do not underlie the active control of the addressee can be used freely in wish-imperatives (*get well soon, have fun, enjoy,* etc.). No such restrictions apply for utterances muttered by the speaker in the absence of the thus merely imagined addressee.

Similarly, present perfect imperatives receive an interpretation Culicover/Jackendoff (1997) dub *absent wishes*:

(40) a. Please don’t have broken another vase!
b. Bitte hab nicht noch eine Vase zerbrochen!
please have.IMP not PRT a vase broken

These are used naturally to express – to oneself – an urgent wish that the addressee, or rather the person one is thinking about should not have broken another vase. Of course, this use of second person in a merely imaginary conversation is by no means special to imperatives. Yet, contrary to what is claimed by Culicover/Jackendoff (1997) and Mastop (2005), for the use of sentences as in (40), there is no need for the addressee to be absent. Imagine a child walking up to her father with a face that does not augur well. Thinking of previous incidents of such a destructive type, the father may well address his daughter with an utterance of (40a/b). One might be tempted to argue away the past reference of such imperatives by resorting to paraphrases (e.g. as coercion) as in (41). The idea is to assimilate the unexpected past relatedness to the occurrence of individual level predicates as in (42). Given that – apart from absent wishes – (42a) is understood as an order to dye one's hair, we can paraphrase it as in (42b) (cf. Barwise/Persloff/Xu 2005 for an agent logic that accounts for such types of coercion).

(41) a. Please, don’t turn out to have broken another vase!
b. Please, don’t say that you have broken another vase!

(42) a. Be blond when you come tomorrow!
b. See to it that you are blond when you come tomorrow!

For (42a) the re-interpretation follows automatically from adopting a deontic background, and it is indeed blocked by a follow up like *but don’t you do anything about it* (here, we are left with a speaker who obviously counts on magic for his wishes to be fulfilled). In contrast, no effects of awkwardness result if (40) is followed by *but if you did, tell me immediately*, clearly incompatible with either of the reinterpretations in (41). I take this to indicate that no re-interpretation takes place and (40) is interpreted straightforwardly as expressing that it is necessary w.r.t. the speaker’s bouletic background that the addressee has not broken another vase. Note that this is the *perfect of result* interpretation of the German present perfect, which renders the predicate stative and is thus entirely unproblematic with imperatives. The perfect of result expresses that a particular result state holds at utterance time, hence, its tense time is still present. Matters become more complicated though if we consider more cases. Assume that the speaker has endorsed a bet with Arnim and finds himself depending on the addressee’s prior actions in order not to lose a bottle of champagne. While waiting for the relevant piece of information, he may well utter to himself, or even to the addressee, any of (43a,b,c) (depending on the content of the bet).

(43) a. Bitte sei seit Weihnachten mal in Frankfurt gewesen *Extended Now*
please be.IMP since Xmas once in Frankfurt been
roughly: ‘I wish for the following to bet rue: you’ve been to Frankfurt at least once since Christmas!’

b. Bitte sei noch immer dort angestellt! *Result*
please be.IMP still there employed
roughly: ‘Please, be still employed there!’

c. Bitte hab 1990 in Tübingen gewohnt! *Past*
please have.IMP 1990 in Tübingen lived
roughly: ‘I wish for the following to be true: in 1990, you lived in Tübingen’
... else I have to buy Arnim a bottle of champagne!

On any popular account of the German perfect, (43a) and (43b) come out as unproblematic. Clearly, in all three cases, what is of interest are the wishes of the speaker at utterance time, hence, the tense time has to be present. The present perfect of Extended Now expresses that being in Frankfurt has to happen within an interval that starts with the last Christmas preceding the utterance time and reaches up to the utterance time. Arguably, this is compatible with an event frame that overlaps c_T (maybe it requires some consideration if the Extended Now interval is argued to not overlap the utterance time; but, at least, no overt adverbial renders salient an event frame that would be properly past). Even more unproblematically, the Perfect of Result definitely claims that a certain post state holds at utterance time. What turns out to be problematic, though, is what von Stechow (2002a) calls the Past-reading of the German Present Perfect. On his account, the present perfect appearing in sentences like (44a) is interpreted as simple Past (cf. (44b)).

(44) a. Wir sind gestern ins Theater gegangen.
we AUX.PRES yesterday in-the theater gone
‘Yesterday we went to the theater.'

b. $[_{CP}\ [_{TP}$ PAST$_i$ $[_{AgrSP}\ [_{AspP}$ PFV $[_{VP}$ we [go to the theater]]]]]]

If this were correct, the imperative in (43c) should behave like a past modal. Yet, no such effect occurs. Clearly, the imperative speaks about the wishes of the speaker at utterance time and asserts that he wants for the year of 1990 to contain a period (or be entirely covered by a period) of the addressee living in Tübingen.

In contrast to what is predicted by the ambiguity analysis, all these facts result naturally from a uniform analysis for the German perfect as proposed by Musan (2000). In a nutshell, the present perfect is interpreted as containing an ordinary present tense and a stative predicate expressing the property of intervals to be preceded by an interval characterized by an event/state of the VP-kind. From the entries in (45), for a declarative sentence like (44a), we obtain the interpretation in (45c).[18,19] (t <| t’ expresses that t’ is the right border of interval t).

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[18] The entries constitute an adaptation of Musan’s relational temporal framework to my deictic system. Moreover, her VPs invariably express properties of intervals, never of events. In order for my VP denotations to be compatible with Perf, I have to assume that there is an AspP below Perf, while Musan assumes Asp to be present above Perf. This is in line with her assumption that cross-linguistic observations necessitate the presence of aspect below Perf in many languages, which is to be accounted for by the possibility of multiply instantiating Asp, as long as it is semantically relevant. In our case, Asp has to occur below Perf and the higher instantiation can be left out as it would not make a semantically relevant contribution.

(45) a. [[PERF]] = P t'. ∃t[t <| t' & P(t)]
b. [$_{\text{TP}}$ PRES [PERF [$_{\text{AspP}}$ PFV [$_{\text{VP}}$ gestern [$_{\text{VP}}$ wir ins Theater gehen]]]]]
c. λw. ∃t[t <| c_T & ∃e[τ(e) ⊆ t & τ(e) in yesterday & we-go-to-the-theater(w)(e)]]

Applying this to the imperatives in (43), what is predicated of the event frame is its being a post state of the addressee having visited Frankfurt before Christmas, the addressee having become an employee with some salient institution, or the addressee having lived in Tübingen in 1990. The problematic past-like (43c) comes out as in (46):[20]

(46) [[[$_{\text{TP}}$ PRES [[IMPMOD H t] [PERF [$_{\text{AspP}}$ AT [$_{\text{VP}}$ 1990 [$_{\text{VP}}$ you live in Tüb.]]]]]]]^{c,g} =
λw. ∀w' ∈ H(w,c_T)[∃t'[t' <| g(t) & ∃e[τ(e) ⊆ t' & τ(e) in yesterday & we-go-to-the-theater$_w$(e)]]

Musan's uniform interpretation for the perfect as introducing a post state not only solves the problem with the invariably present tense time of the imperative, it also obviates a problem with an apparently past event frame. The temporal adverbial *1990* does not constrain the event frame itself, but the run time of the VP. What is predicated of the event frame is not for it to have this VP property (which would require a non-empty intersection with the bygone 1990), but rather that it is a post state of an interval that has the VP property. Thanks to the persistence of post states, if the addressee has lived in Tübingen for some or all of 1990, any subsequent interval has the respective post state property. The utterance time itself (or an interval surrounding it) can easily serve as a pragmatically salient event frame.

The event frame can also be located in the future, as under the most prominent reading for (47).

(47) (*I will to talk to my boss at 8.)*
Bitte hab mich dann schon angerufen!
please have.IMP me then already called
roughly: 'Please have called me by then!'

In this case, the event frame is in the future, and the truth or falsity of the imperative's argument proposition is not only unknown in the utterance context, but can easily be taken to be metaphysically undecided. Therefore, in case of a truly future event frame, the imperative is not confined to a usage as a wish, but can also be used felicitously as a command.

I take the facts from present perfect imperatives to constitute evidence for a uniform analysis for the German present perfect. Combining the modal semantics for imperatives and Musan's uniform analysis of the present perfect allows for a straightforward account of an otherwise puzzling and seemingly non-compositional phenomenon.

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[19] Drawing on arguments from possible focus alternatives depending on accent patterns, Musan argues that Perf is realized as the morphosyntactic complex of auxiliary and participle morphology. These syntactic details do not affect our semantic investigation.

[20] I ignore the ambiguity arising from the direction of the inclusion relation between the time introduced by aspect and the state of living in Tübingen that is anchored with respect to it.

5. Conclusions and Outlook

In this paper, I have argued that the temporal behaviour of imperatives can be analysed naturally and in a compositional way, if we adopt a modal operator account for imperatives. Imperatives are interpreted as propositions that express necessity of a contextually given flavor that underlies certain restrictions. The latter confine it to performative, that is, non-descriptive usages. In particular, it is required that the addressee be an authority on the relevant sort of necessity. As for other modal operators, we have to distinguish between when the background of the necessity is to be calculated – the tense time (mostly, the utterance time, but cf. sections 4.2, 4.3), and the interval, at which the event/state in question is to hold – the event frame. In present tense imperatives, the latter is required not to be properly past. German and English keep this requirement, even if the tense time is shifted by a speech report. In contrast, Dutch counterfactual imperatives require precedence with respect to the shifted tense time. Data from North American Indian languages suggest that they possess morphological forms that distinguish between how far in the future the event state is situated. Last but not least, I have discussed present perfect imperatives in German that are used to express wishes. I have argued that we can account for these facts if we adopt a uniform analysis of the perfect that takes it to describe post states of particular events/states.

I hope to have shown that the context dependent modal semantics for imperatives, together with the consideration of speech act properties brought in by particular settings for the parameters of the corresponding modal operator, provides a seminal starting point for the discussion of temporality in imperatives across languages.

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Anastasia Giannakidou

(Non)veridicality and Mood Choice: Subjunctive, Polarity, and Time

0. Abstract

In this paper, I consider the lexical parameters determining the choice of subjunctive in Greek. I first show that in Greek the subjunctive concerns two syntactic positions: one is the verb form, where a perfective non-past (PNP) appears; the other is a higher particle *na* which is generated as a mood head. We examine the distribution of *na*+PNP in complement clauses, adjunct clauses, and uses of it under negation and in relative clauses (known as "polarity" subjunctives). We also show a vast correlation between polarity item licensing and subjunctive clauses in Greek, suggesting that the same property is regulating both the subjunctive and polarity items. I propose, building on my earlier works, that this property is nonveridicality: verbs selecting the indicative are veridical, and those selecting the subjunctive are nonveridical; the subjunctive will be selected also by nonveridical adjuncts, and can be triggered by antiveridal negation. After we establish sensitivity to nonveridicality, we address the question: what is the relation between the particle and the verbal dependent? Why does the latter need the former? I argue that we can explain the dependency of *na*+PNP if we assume that the tense of PNP is a *non-deictic* (Giannakidou 2009, in press) variable , i.e. it cannot make reference to a contextually specified time. It is the presence of this variable that renders PNP unusable in veridical contexts.

1. The Formal Marking of Grammatical Mood: Two Main Patterns

The study of grammatical mood has a venerable tradition that I will not be able to do justice to in the present paper. In the study of classical languages, i.e. Ancient Greek and Latin, we talk about a number of moods: indicative, subjunctive, optative, imperative, at least – and these appear in main as well as embedded clauses. The indicative is typically the mood of unembedded assertions, and subjunctives can appear in main as well as embedded clauses (but the optative and the imperative resist embedding.[1] In modern Indo-European languages, the central mood opposition when it comes to main *and* embedded clauses is the one between indicative and subjunctive, and this will be the main focus of the paper.[2]

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[1] But see Bostjan Dvorák, Ilse Zimmermann 2007 for embedded imperatives in Slovenian, and Potner 2006 for some facts about Korean. I will not discuss the imperative in this paper.

[2] It is important to emphasize here that in my view, what traditional grammars call "subjunctive" is a landscape, i.e. a family of dependencies, not all necessarily identical to one another. What I will argue for in the paper is that nonveridicality is a notion necessary for explaining a big part of those dependencies. The "subjunctive", however, is used as a label for uses that do not follow from non-

The formal marking of mood can be a little piece of morphology on the verb, as illustrated below with French, and Greek examples:

(1) Marc **croit** que le printemps **est/*soit** arrivé.(French)
‘Marc believes that spring has-IND arrived.’
Marc **veut** que le printemps **soit/*est** long.
‘Marc wants that the spring be-SUB long.’

(2) Pes to. (Imperative: Greek)
say.IMP.2sg it
‘Say it.’

A designated mood form is used in French and Greek to formally mark the verb as indicative or subjunctive (French), or imperative (Greek). So it is said that the verb *croir* ‘believe’ *selects* the indicative, but the volitional verb *vouloir* ‘want’ selects the subjunctive. English too has a verb form ‘subjunctive’ following a verb like *require:*

(3) a. The Dean **believes** that we **were/*be** on time.
b. The Dean **requires** that we **be/are** on time.

The subjunctive is optional in English with directive verbs like *require*, which can also appear in the indicative. So, there is no real selection in English (or, it is very limited), the subjunctive is triggered like a polarity item. We will talk more about the polarity subjunctives later.

In Greek, only the imperative is designated by verbal morphology. The subjunctive and indicative, and here is the second pattern, are signaled by subordinating particles. This pattern is common in Greek (and other Balkan languages), as well as Romanian (Farkas 1985, Rivero 1994, Terzi 1992, Giannakidou 1998, 2009, Roussou 2000, Bulatovic 2008). I illustrate here the Greek indicative particles:

(4) O Pavlos ipe **oti** efije i Roxani.
the Paul said.3sg that left.3sg the Roxani
‘Paul said that Roxanne left.’

(5) O Pavlos lipate **{pu/*oti}** efije i Roxani.
the Paul is-sad.3sg that left.3sg the Roxani
‘Paul regrets that Roxanne left.’

A complement introduced with *oti* is traditionally described as being in the indicative mood (Holton et al. 1997, Philippaki-Warburton 1994 and later works). *Oti* is a complementizer, and the indicative mood has no overt exponent on the verb, as we see, where the verb is in the simple past tense. (The verbal mood paradigms of Ancient Greek do not survive in the modern language.). *Pu* is the ‘presuppositional’ complementizer used for complements of *emotive* factive verbs like *lipame, metaniono* ‘regret’, *xerome* ‘be-glad’ (cf. Christidis 1981;

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veridicality (at least not without adjustments); e.g., the Latin and German paradigm of “subjunctive” of *indirect speech* (*Konjuktiv* I) after verbs of saying.The languages discussed in the text (modern Romance languages and Greek) do not exhibit this use, and verbs of saying typically select the indicative. There is also the paradigm known as *Konjunktiv II*, which I think is closer to the conditional mood.

Varlokosta 1994; Roussou 1994, 2000), as well as some epistemic factives such as *thimame* ‘remember’, *paraponieme* ‘complain’, which can alternate between the *oti* and *pu*:

(6) a. O Janis paraponethike **oti** ton ksexasa.
The John complained.3sg hat him forgot.1sg
‘John complained that I forgot him.’
b. O Janis paraponethike **pu** ton ksexasa.
The John complained.3sg that him forgot.1sg
‘John complained that I forgot him.’

The *pu* clause is a ‘real’ factive, presuppositional complement: the propositional content *p* survives under negation, which is not the case for the *oti* complement:

(7) a. O Janis dhen paraponethike **pu** ton ksexasa. → I forgot John
The John not complained.3sg that him forgot.1sg
‘John did not complain that I forgot him.’
b. O Janis dhen paraponethike **oti** ton ksexasa. -/→ I forgot John

Hence the truth of the complement is an entailment with *oti* but a presupposition with *pu*. Both complements, though, express truth commitment, and this will be the basis for characterizing them as indicative and veridical (in section 4). We will revisit this pattern later in more detail.

So, the indicative is a simple tense in Greek (past, as in the examples above, or future with “tha”; Giannakidou 1998, Tsangalidis 1998; Philippaki 1993); and becomes visible with a designated particle in C (which I will be glossing from now on as *that.IND*). With subjunctive complements, the subordinator appears to be *na*:

(8) Thelo na kerdisi o Janis.
want.INP.1sg SUBJ win.PNP.3sg the John
‘I want John to win.’

Greek *na*-clauses come after verbs of volition, directives, and modals, and correspond to English infinitives, hence the contrast *oti/pu* (indicative) versus *na* (subjunctive) maps, at least superficially, to a difference between *that* and *to*. Just like inifitivals, *na* complements can be dependent temporally on the tense of the higher verb (for more discussion, Giannakidou 2009). I will not gloss *na* as *that.SUBJ* because *na* is not a complementizer (see section 2).

Crucially, as I mentioned earlier, the verb in both *oti/pu* and *na* complements does not contain specified mood morphology; but with *na* the perfective non-past (PNP) is used – designated as PNP in the gloss. This is a dependent form itself:

(9) *To pis. ‘it say.PNP.2sg’ (PNP: *on its own)

The PNP does not occur alone; it must always be embedded, and is therefore characterized as a *dependent* form. Besides *na*, the PNP appears also after *tha* (future particle), conditional *an,* and nonveridical connectives as we see later.

(10) a. Tha to pis. (tha)
FUT it say.PNP.2sg
‘You will say it.’

b. An to pis,…. (*if*)
if it say.PNP.2sg
'If you say it,...'

c. Na to pis. (*na)*
SUBJ it say.PNP.2sg
'You may say it.'

The *na* version, which is the subjunctive, occurs in main clauses too, as we see, in which case it tends to be interpreted as a "mild" imperative – a permission, or a polite request, indicated above by using "may" in English. The subjunctive in main clauses contains further embedding, then, with a force operator or a covert deontic modal in C (I will not consider this theoretical choice in this paper; see Schwager 2007 for a unifying analysis of imperatives and modals, and Portner 2006 for a more skeptical view). It is important to know, however, that in main clauses the *na*+PNP can embed under epistemic modal particles as *perhaps* (Giannakidou 2009)*:*

(11) Isos na erthi o Janis. 'Maybe John will come'.
Perhaps SUBJ come.PNP.3sg the John

This is not a request, but a sentence with epistemic modality (Giannakidou 2009). So, *na*+PNP can be overtly embedded in main clauses, and indeed not always associated with deontic force.

The forms *tha* PNP and *an* 'if' PNP are not thought of as subjunctives in Modern Greek because they do not contain *na,* which is the formal marker of the subjunctive. Instead, they express the future, and *an* is the conditional subordinator. So, in Greek, the subjunctive is marked both by means of *na* and the dependent verbal form PNP, and it is important to understand the relation between the two, a task that I undertake in section 5.

2. The Syntactic Status of *na* and the Greek Clause

In this section, I will present the basic clause structure of Greek that I will be assuming (argued for in Giannakidou 2009), and within which we will understand the place and role of the subjunctive. In the long history of the syntactic characterization of the particle *na,* the main question has been: is *na* a Mood element or a complementizer? In one approach, *na* is the head of the inflectional category Mood (MoodP; Philippaki-Warburton 1993, 1998, Philippaki-Warburton/Veloudis 1984, Tsimpli 1990, Giannakidou 1998, 2009). The second approach claims that *na* is a complementizer (Agouraki 1991, Tsoulas 1993, and Roussou 2000, who uses an extended C-domain in the spirit of Rizzi 1997). *Na* as a C captures the fact that *na* appears as a subordinator in embedded clauses. The pure C-analysis of *na*, however, has to meet a number of challenges which have been pointed out in the abovementioned analyses of *na* as mood.

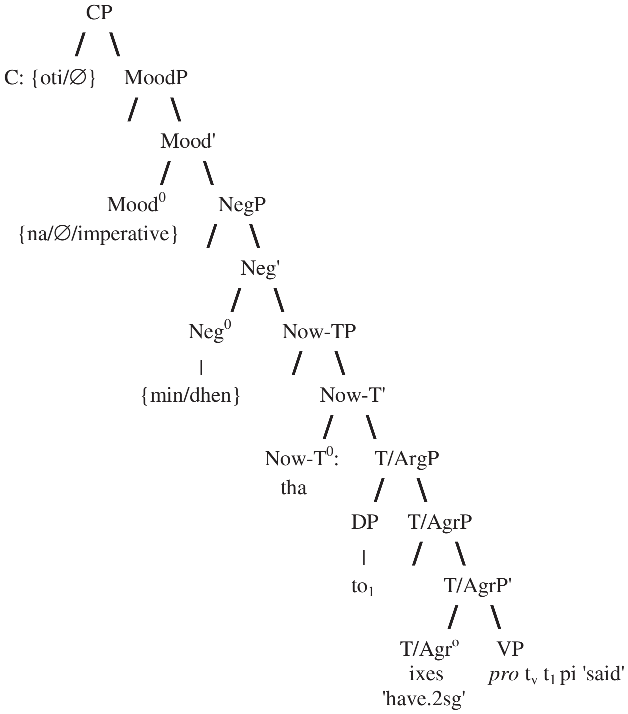
In Giannakidou (2009), I suggest that *na* is a Mood head linked to a complementizer C with the illocutionary force of the imperative. Here I will stick to that analysis, but relax the condition that the force in C is imperative, since *na* is also compatible with epistemic force (*perhaps*, which I just mentioned) and interrogative force, as we see below:

(12)	Pjos	na	kerdise	(araje)?
	who	SUBJ	win.PP.3sg	question particle
	‘Who (do you think) won?’			

Here we have a question, and C hosts the function turning a proposition into a question. *Na* questions are described as dubitative (Rouchota 1994), a flavor due to the particle *araje* (used only in questions), and captured in the translation here by using an epistemic word. It is clear then that *na* does not have force of its own but depends on the force that C provides.

That there is a higher C position above *na* is also evidenced by the fact that higher complementizer elements may preceed *na*: ja ‘for’ in *ja na* for purpose clauses, *xoris na* ‘without’, *prin na* ‘before’, *oste* na ‘with the result that’ (for some more details see Giannakidou 2009, and again later in section 3). It thus makes sense to understand *na* being itself subordinated syntactically to the higher C position. The resulting structure will be the following:

(13)



In C, we see the subordinators *oti, pu*, plus the other subordinating elements I just mentioned. The C position may also host the covert deontic force operator of the *na* clause (and operators with other forces too, naturally). The imperative moves to the C position

(Rivero/Terzi 1994, Giannakidou 1998) to acquire its deontic force. *Na* is in Mood, followed by negation (*na min*, but not **min na*). Now-T is the projection of PRES, i.e. where the *now* is introduced (Giannakidou 2009), and hosts the so-called future particle *tha*, which turns out to be just a present marker in this analysis. The indicative is a zero morpheme (Philippaki-Warburton 1993) in Mood. This tree poses an interesting relation between C and Mood, with indicative being overtly realized in C (*oti, pu*), and the subjunctive in Mood.

With this background – to which we will return in section 5 – I will now proceed to examine in more detail the empirical patterns of mood choice in embedded clauses in Greek. The discussion continues as follows. In section 3, we review the core empirical patterns of mood choice in Greek, as well as the correlation with polarity items licensing. In section 4, I outline the nonveridicality theory. In section 5 we discuss the temporal properties of the subjunctive and use them to explain the limitation of the subjunctive to nonveridical contexts.

3. Empirical Patterns of Mood Choice in Greek: Selection, Polarity Subjunctive, and NPIs

Most accounts of mood in various theoretical and descriptive frameworks agree that mood phenomena must best be thought of as a dependency between a property of the higher verb (or element, in the case of polarity subjunctive), and mood in the lower clause. What is this property? Philosophical treatments of mood originate in the discussion of conditionals in possible world semantics (Anderson 1951, Stalnaker 1968, 1979), and in speech act and illocutionary force discussions (Searle 1969, Searle/Vanderveken 1985, among others); but the traditional grammarian's view of the division corresponds to the *realis* (indicative) and *irrealis* (subjunctive) distinction.

Empirical problems with the traditional *realis/irrealis* division prompted refinements based on nonveridicality (Giannakidou 1994, 1997, 1998, 1999), model shift (Quer 1998, 2001), and non-propositional semantics for subjunctive clauses (Portner 1997; also Laca 2010 for volitionals in particular). Sometimes also the concept of *notional mood* is used (attributed to Jespersen intially; Portner 1997, 1998; Giorgi/Pianesi 1997; Yoon 2010). Notional mood classifies clauses *by a semantic principle* concerning the *speaker's, or some individual's commitment about the truth of the sentence*; Giorgi/Pianesi (1997) define notional mood as the complex of semantic factors concerning the classification of the contexts in which *the truth conditions of clauses are assessed.* So it is generally recognized that truth assessment is necessary for understanding mood choice. My notion of nonveridicality targets precisely this observation.

My goal in sections 3 and 4 is to show that if we assume that nonveridicality is the property that determines lexical selection of mood in embedded clauses and with adjuncts in Greek, we can also explain the subjunctive in non-selection patterns, thus enabling a unifying analysis. Nonveridicality also will be crucial for the correlation between the subjunctive and NPI-licensing (Giannakidou 1998, 1999), which I will briefly discuss in section 3.3. There is also a correlation between the subjunctive, expletive negation, and nonveridicality (observed initially in Espinal 2000, and more recently exploited in Korean and Japanese (Yoon 2010), a topic that unfortunately I cannot expand on here. These correlations present empirical and analytical advantages that other theories will have to match when compared to the nonveridicality approach.

In this section we first review (3.1) the basic selection patterns in embedded clauses in Greek. These facts are well known (Giannakidou 1994, 1995, 1997, 1998, 1999, 2009), so I will only summarize them here, also briefly presenting some new facts on mood alternation, and mood selection in adjunct clauses. Next, I present in section 3.2. the correlation between mood and polarity item licensing: NPIs are licensed in subjunctive clauses but not in indicative ones. In section 3.3. we discuss the so-called polarity subjunctive triggered mainly by negation and in relative clauses in Greek. The broad set of facts presented here will be shown to follow in section 4 if we assume that mood choice and NPI licensing in Greek are regulated by (non)veridicality. Borschev et al. 2007, based on a similar set of facts, propose that (non)veridicality is the relevant notion for mood selection also in Russian.

3.1. Basic selection patterns in Greek in complement and adjunct clauses

In my earlier work, I posited a divide within the class of attitude verbs depending on whether at least one epistemic agent (the speaker or the subject of the main verb) is committed to the truth of the complement sentence. If an attitude verb expresses such a commitment, it will be veridical and select the indicative; if not, it will be nonveridical and select the subjunctive.

(A) Indicative complements
Summarizing, the verbs that select indicative (*oti* and *pu*) complements are listed below:

(14) *Indicative verbs* (selecting *oti*, *pu* complements)
assertives: leo ‘say’, dhiavazo ‘read’, isxirizome ‘to claim’
fiction verbs: onirevome ‘to dream’, fandazome ‘imagine’
epistemics: pistevo ‘believe’, nomizo ‘think’
factive verbs: xerome ‘be glad’, gnorizo ‘know’, metaniono ‘regret’
epistemic factives: anakalipto ‘discover’, thimame ‘remember’

Fiction and epistemic verbs express commitment to the truth of their complement by the main clause subject. These verbs select the indicative also in Romance languages (with the exception of Italian epistemic verbs in obviating; Quer 2001:92 shows that with first person the indicative is selected in Italian). Some illustrations of Greek indicative complements are given below:

(15) a. O Pavlos **pistevi** **oti** i Maria efije.
the Paul believe.3sg that.IND Mary left
‘Paul believes that Mary left.’
b. **Kseri** **oti** aγorasa ena aftokinito.
know.3sg that.IND bought.1sg a car
‘He knows that I bought a car.’

c. I Maria **onireftike** **oti** aγorasa ena aftokinito.
Maria dreamt.3sg that.IND bought.1sg a car
'Maria dreamt that I bought a car.'

d. I Maria **isxiristike** **oti** aγorasa ena aftokinito.
The Maria know.3sg that.IND bought.1sg a car
Maria claimed that I bought a car.

e. I Maria **xerete** {*oti/**pu**} aγorasa ena aftokinito.
Maria is-glad.3sg that.IND bought.1sg a car
Maria is glad that I bought a car.

Notice that the choice of indicative after epistemic, dream, and fiction verbs contradicts the traditional view that the indicative is the mood of *realis* contexts, since epistemic complements do not imply truth *in the actual world*. Factive verbs, as mentioned earlier, appear in the indicative *pu* complement in Greek, but they can choose between the indicative and the subjunctive in Romance, as indicated in the examples below from Catalan (from Quer 2001):

(16) a. Es queixa que no li facin cas.
'S/he complains that they don't pay-SUB attention to him/her.'

b. Es queixa que no li fan cas
'S/he complains that they don't pay-IND attention to him/her.'

Quer describes the contrast as follows: "When indicative is an option, the factive-emotive predicate yields an *assertive* reading which is absent with a subjunctive argument clause: whereas the embedded proposition is presented as old information in (49a) [here 16a, with subjunctive] and the assertion is limited to the main predicate, in (49b) [here 16b, with indicative] both the matrix and the subordinate clause are asserted. This is most natural when the assertive character of the predicate is straightforward." (Quer 2001:107-108). In other words, the subjunctive complement is a true presuppositional factive complement, but the indicative complement is only entailed. Recall (section 1) that this contrast in Greek surfaces with a difference between a *pu* and an *oti* complement. I repeat here the crucial examples:

(17) a. O Janis paraponethike **oti** ton ksexasa.
The John complained.3sg that.IND him forgot.1sg
'John complained that I forgot him.'

b. O Janis paraponethike **pu** ton ksexasa.
The John complained.3sg that.IND him forgot.1sg
'John complained that I forgot him.'

The *pu* complement, as I stated earlier, is the 'real' presuppositional complement, because it remains true under negation; but the truth of the *oti* complement is only an entailment. Importantly, *na* is not an option with presupposed complements in Greek (as pointed out also in Quer 2001).

(18) *O Janis paraponethike **na** ton {ksexasa/ksexnao}.
The John complained.3sg that him forgot.1sg/forget.imperf.1sg
'John complained that I {forgot/forget} him.'

So, factive verbs only allow indicative complements in Greek. The triggering of the subjunctive with presupposed complements in Romance does not follow from the veridicality perspective I posit here (and see Quer 2001 for some ideas for a solution appealing to the causative character of the subjunctive complement); but note that this is not a problem in Greek. Quer additionally notes that "The appearance of subjunctive with factive-emotives should not be ascribed to some notion of 'subjectivity' underlying the expression of emotions or to evaluative character (*contra* Farkas 1992): purely evaluative predications take the indicative without any trouble, as attested in (52).

(52) *Llàstima que no van arribar a l'hora*
pity that not AUX.IND.3PL to-arrive on time
'Pity they did not arrive on time.'" (Quer 2001: 109)

No matter what the explanation is for the presuppositional subjunctive after factives in Romance – an open question, as far as I can tell – in Greek, as I said, the *na* complement is not presuppositional. This is also noted by Quer, who gives the paradigm below:

(19) a. Tis arese {pu/*na} pighate(PAST.PERF) moni sas. (Quer 2009: 19)
'She liked it that you went just the two of you.'
b. Tis aresi {pu/*na} pighate(PAST.PERF) moni sas.
'She likes it that you went just the two of you.'
c. Tis aresi {pu/na} pijenete (NONP.IMPERF.) moni sas.
'She likes it that you go just the two of you.'

The good *na* example in c requires imperfective aspect and can only be habitual. The habitual does not give us commitment to the truth of the complement – as habitual, generic generalizations are not necessarily about *actual* generalizations (Krifka et al. 1995). In the *na* version of the grammatical *c* sentence, there is no entailment that "you actually go just the two of you"; the sentence can be continued by something like "but you never get the chance to do that", a continuation unacceptable with the *pu*-version. So, we can safely conclude that the *na* sentence cannot be used to make reference to a fact.

(B) Subjunctive verbs (verbs selecting *na*-complements)
Like in Romance, verbs selecting *na*-clauses are volitional, directive, modal, and negative verbs meaning *fear, forbid*. Often, the *na*-clause refers to future action with respect to the selecting verb's time:

(20) Subjunctive verbs
Volitionals: thelo 'want', elpizo 'hope', skopevo 'plan'
Directives: dhiatazo 'order', simvulevo 'advise', protino 'suggest'
modals: (invariant) prepi 'must', *bori* 'may'
permissives: epitrepo 'allow'; apagorevo 'forbid' (negative permissive)
negative: apofevgho 'avoid', arnume 'refuse'

Given the prevailing future or modal interpretation of these verbs, they do not express commitment to the truth of their proposition: I may want to be an astronaut, but wanting to be a astronaut doesn't make me one. Here are some examples:

(21) a. I Maria **theli** **na** aγorasi ena aftokinito.
Maria wants SUBJ buy.3sg a car
'Maria wants to buy a car.'

b. I Maria **protine** **na** aɣorasoume ena aftokinito.
Maria suggested.3sg SUBJ buy.1pl a car
'Maria suggested that we buy a car.'
c. I Maria **epimeni** **na** aɣorasoume ena aftokinito.
Maria insists SUBJ buy.1pl a car
'Maria insists that we buy a car.'
d. **Prepi** **na** aɣorasoume ena aftokinito.
must.3sg SUBJ buy.1pl a car
'We must buy a car.'
e. **Bori** **na** aɣorasoume ena aftokinito.
must.3sg SUBJ buy.1pl a car
'Maria insists that we buy a car.'

Some verbs may alternate between subjunctive and indicative complements – such shifts are common crosslinguistically among verb classes, and are usually accompanied by a change in the verb meaning (Giannakidou 1995; Quer 1998, 2001 2009). Recall our discussion of factives in Romance, or the alternation between the *oti* and *pu* complement. Consider now the following:

(22) a. O Janis lei **oti** efijan noris.
The John says that-IND left.3pl early
'John says that they left early.'
b. O Janis lei **na** figoun noris.
The John says SUBJ leave.3pl early
'John {**wants/is planning**} them to leave early.'

Lei 'says' with the *oti* complement has its reporting meaning, but with the *na* complement it acquires a volitional, directive meaning. I will give another example with the factive verb:

(23) a. O Janis xarike **pu** episkeftike ti jaja tu.
The John was-happy.PERF.3sg that.IND visited.PRF.3sg his grandmother
'John was happy that he visited his grandmother.'
b. O Janis xerotane **na** episkeptete ti jaja tu.
The John was-happy.IMPERF.3sg SUBJ visit.IMPERF3sg his gr.mother
'John was happy to visit his grandmother (that summer).'

Of the two sentences, only the *pu* version is factive, as I said earlier: there is a fact that John visited his grandmother (hence that John visited his grandmother is true), and that fact made John happy. Notice the perfective in both the higher and the lower verb. The *na* version, on the other hand, contains imperfective on both forms, and this renders the sentence habitual, as can be seen in the translation by the addition of *that summer*. With a non-emotive factive, the *na* complement is equivalent to a *how-to* complement in English (see Varlokosta 1994):

(24) O Janis kseri (pos) **na** kolibai.
The John knows3sg how SUBJ swim.imperf.3sg
'John knows how to swim.'

Here it is plausible to assume that *pos* 'how" is present in C, since the word can also be realized. More manifestations of C we see below with the adjunct clauses.

(C) The subjunctive in adjunct clauses

In adjunct clauses, non-veridical connectives *xoris* 'without' and *prin* 'before' select the subjunctive (Giannakidou 1994, 1998, Giannakidou/Zwarts 1999):

(25) a. Ekane ti metafrasi xoris na xrisimopiisi leksiko.
Did.3sg the translation without SUBJ use.perf.NONPAST.3sg dictionary
'He did the translation without using a dictionary.'
b. *Ekane ti metafrasi xoris xrisimopiise leksiko.
Did.3sg the translation without use.perf.PAST.3sg dictionary

(26) a. Prin na kimithi, epline ta dontia tu.
Before SUBJ sleep.perf.NONPAST.3sg washed.past.3sg his teeth
'Before sleeping, he brushed his teeth.
b. *Prin kimithike, epline ta dontia tu.
Before sleep.perf.PAST.3sg washed.PP3sg his teeth

All sentences make reference to the past, but as we see, the past tense is not allowed. Instead, *na* and PNP are used. The meanings 'without' and 'before' are nonveridical (Giannakidou 1997, 1998, Zwarts 1995, Giannakidou/Zwarts 1999): *without a dictionary* entails *not using a dictionary*, and *p before q* does not entail *q*. Equivalents of *before* select the subjunctive in French and other Romance languages. Notice that the subjunctive here, which is not selected by a higher verb, does not itself convey gradability semantics – a problem for approaches positing that the subjunctive depends on elements with preference ordering (Villalta 2009).

With veridical particles, on the other hand, such as *afu* 'after', the subjunctive is out:

(27) a. *Afu (na) kimithi, figame.
after SUBJ sleep.PNP.3sg left.3sg
b. Afu kimithike, figame.
after slept.3sg left.3sg
'After he slept we left.'

P after q entails *q*, so *afu* 'after' is veridical. I have not yet defined the terms veridical and nonveridical, but I wanted to give these informal descriptions here in order to anticipate the discussion in section 4. Clearly, the prospective time of *before* renders it nonveridical, but the *after* time is retrospective (i.e. past with respect to the *p)* and this makes is veridical. Notice, in this connection, that *prin* 'before' xoris 'without') license negative polarity items (NPIs) and free choice items (FCIs), but *afu* 'after' doesn't (Giannakidou 1998). The fact concerns both Greek and English:

(28) a. I Maria efije prin na milisi me {kanenan/opjondhipote}.
Mary left before she talked to anybody.
b. *I Maria efije afu milise me {kanenan/opjondhipote}.
*Mary left after she talked to anybody.
c. I Maria ekane ti metafrasi xoris kamia voithia.
Mary did the translation without any help.

We see here that *prin* 'before' but not *afu* 'after' allow the NPI *kanenan* or the FCI *opjondhipote* (Giannakidou 2001); notice the exact parallel with *any,* despite the absence of mood distinction. These facts suggest that nonveridicality is relevant not just to mood selection, but also to polarity item licensing. More facts supporting this correlation are coming next.

3.1. Polarity licensing correlates with mood choice in embedded clauses

In Giannakidou (1994, 1995, 1998, 1999, 2001) I noted that NPIs and FCIs appear in the complements of the subjunctive selecting attitudes and modal verbs (and with future tense), but not in indicative complements. Notice the contrasts below:

(29) I Ariadne **epemine** **na** afisoume **{opjondhipote/kanenan}** na perasi mesa.
the Ariadne insisted.3sg SUBJ let.PNP.1pl FCI-person/ NPI-person SUBJ come.3sg in
'Ariadne insisted that we allow anyone in.'
With *kanenan:* 'Ariadne insisted that we allow **some person or other** to come in.'

(30) I Ariadne **tha ithele** **na** milisi me {**opjondhipote/kanenan**} fititi.
the Ariadne would like.3sg SUBJ talk.PNP.1sg with FC- /NPI- student
'Ariadne would like to talk to any student.'

(31) I Ariadne bori na milisi me {**opjondhipote/kanenan**}
Ariadne may SUBJ talk.PNP.3sg to anybody.

(32) a. *O Pavlos **pistevi** oti akuse {**kanenan/opjondhipote**} θorivo.
the Paul believe.3sg that.IND heard.3sg NPI / FCI noise
'*Paul believes that he heard any noise.'
b. ***Kseri** oti aγorasa {**kanena/opjodhipote**} aftokinito.
know.3sg that.IND bought.1sg NPI / FCI car
'*He knows that I bought any car.'

This contrast holds in other languages that have similar polarity items and the subjunctive, e.g. Spanish and Catalan (the data below are from Quer 1998, 1999):

(33) a. La Paola **vol** evitar que disaparegui **qualsevol** llengua minoritària. (Catalan)
b. Paola **quiere** evitar que desaparezca **cualquier** lengua minoritaria. (Spanish)
Paola want.3sg avoid disappear.subj.3sg FC language minoriatia
'Paola wants to prevent any minority language from disappearing.'

(34) a. *La Paola **creu** que desapareix **qualsevol** llengua minoritària. (Catalan)
b. *Paola **cree** que desaparece **cualquier** lengua minoritaria. (Spanish)
Paola believe.3sg that disappear.ind.3sg FC language minority
'*Paola believes that any minority language is disappearing.'

Notice also that the correlation holds regardless of the formal marking of mood. In English, *any* also appears in the complement of directive verbs – *would like, ask, be willing* – and is excluded from the complements of epistemic and dream/fiction verbs:

(35) a. John would like to invite any student.
b. John asked us to invite any student.
c. John is willing to invite any student.
d. I insist that you allow anyone in.

(36) a. * John believes that we invited any student.
b. * John dreamt that we invited any student.

Recall in addition that NPIs and FCIs appear in *before* but not *after* clauses. These facts are problematic for the downward entailment (DE) approach to polarity, including von Fintel's (1999) *Strawson* DE (see recent discussion of this in particular, and comprehensive criticism of Strawson DE in Giannakidou 2006). But nonveridicality captures the correlation between the embedding predicate and connective and PI-licensing, as I have shown in my earlier work.

The so-called polarity uses of the subjunctive, as we see next, can also be captured as sensitivity to nonveridicality.

3.2. Subjunctive as polarity item: with negation, in relative clauses

Here we discuss the so-called polarity subjunctive (Quer 1998, 2009 and references therein), where the subjunctive seems to behave like a PI itself. The subjunctive can be triggered in the lower clause if the higher verb, which otherwise selects the indicative, is negated. This holds for a number of languages: Greek (Giannakidou 1995), Romance (Quer 1998, 2001, 2009), and Balkan languages (Siegel 2009):

(37) Pienso que **está** dormida (Spanish)
think.1sg that 3.s.be.**IND** asleep.Fem
'I think she is asleep.'

(38) **No** pienso que **esté** dormida.
not think.1sg that 3.s.be.**SUB** asleep.Fem
'I don't think she is asleep.'

(39) a. Pistevo **oti** irthe o Janis. (Greek)
believe.1sg that.IND came.3sg the John
'I believe that John came.'
b. **Dhen** pistevo **oti** irthe o Janis.
not believe.1sg that.IND came.3sg the John
'I don't believe that John came'.
c. **Dhen** pistevo **na** irthe o Janis.
not believe.1sg SUBJ came.3sg the John
'I don't **expec**t that John came. (I would hope he didn't).'

Here the subjunctive is licensed by negation, itself like an NPI; and notice that there is a choice between the subjunctive and the indicative. Importantly, the use of the subjunctive comes with a meaning shift in the main predicate: *dhen pistevo na* in the example loses its epistemic meaning and means rather something akin to "I hope not". This meaning shift was observed, as I said earlier, in almost all cases of alternating mood patterns.

In Giannakidou (1998: chapters 2, 3), I showed that *na* also appears in relative clauses (see Veloudis 1983/84 for the initial observation), when these are in the scope of subjunctive taking verbs and negation. This use of the subjunctive in relative clauses is found in Romance (Farkas 1985) and Russian (Borchev et al. 2007, Partee 2008). Consider the following example:

(40) Theloume na proslavoume mia gramatea [pu **na** gnorizi kala japonezika].
want.1pl subj hire.1pl a secretary that SUBJ know.3sg good Japanese
'We want to hire a secretary that has good knowledge of Japanese. (But it is hard to find one, and we are not sure if we will be successful).'

(41) $\exists w_{fut}[\ \exists x\ secretary(x, w) \wedge speaks\ good\ Japanese\ (x,w) \wedge hire\ (we, x,w)]$

The use of the subjunctive in the relative clause forces the NP to be interpreted inside the scope of *thelo* 'want' – indicated above by relativizing it to some future world w. The NP can thus only be interpreted *de dicto*, and we may not find a secretary with knowledge about Japanese. Without the subjunctive, the NP is forced to be interpreted outside the scope of *thelo* "want", *de re*:

(42) Theloume na proslavoume mia gramatea [pu gnorizi kala japonezika.]
want.1pl subj hire.1pl a secretary that know.3sg good Japanese
'We want to hire a secretary that has good knowledge of Japanese. OK: Her name is J. Smith.'

(43) $\exists x\ secretary(x, w_0) \wedge speaks\ good\ Japanese\ (x, w_0) \wedge \exists w'_{fut}[hire\ (we, x,w')]$

As a result, we cannot have definites being modified by subjunctive relatives, and the subjunctive will obligatorily be used with verbs of creation:

(44) I Roxani theli na pandrefti {**enan/*ton**} andra pu na exi pola lefta.
the R. want.3sg subj marry.3sg a/*the man that SUBJ have. much money
'Roxanne wants to marry a man who has a lot of money.'

(45) Prepi na grapso mia ergasia [pu **na** ine pano apo 15 selidhes.]
must.3sg subj write.1sg an essay that SUBJ is more than 15 pages
'I have to write an essay which has to be longer than 15 pages.'

(46) */#Prepi na grapso mia ergasia [pu ine pano apo 15 selidhes.]

Importantly, negation also triggers subjunctive in the relative clause, which is again reminiscent of NPI behavior:

(47) Dhen idha enan andra [pu **na** forai kokino kapelo.]
not saw.1sg a man that SUBJ wear.3sg red hat
'I didn't see a man wearing a red hat.'

(48) $\neg\exists x\ [man(x) \wedge wear\text{-}red\text{-}hat\ (x) \wedge saw\ (I,x)]$

(49) Dhen idha enan andra [pu forai kokino kapelo.]
not saw.1sg a man that wear.3sg red hat
'I didn't see a man wearing a red hat.'

(50) $\exists x\ [man(x) \wedge wear\text{-}read\text{-}hat\ (x)] \wedge \neg\ saw(I, x)$

The NP with the subjunctive again takes narrow scope with respect to negation, but without *na* the NP takes wide scope. In Giannakidou (1997, 1998) I argued that the indicative relative is a positive polarity item, whereas the *na* relative should be understood as a narrow scope PI. Given that negation is not an intensional operator, it is important to emphasize here that subjunctive triggering in relative clauses in Greek (and see Partee 2008 for similar data in Russian) cannot be understood as sensitivity to intensionality, as was claimed initially by Farkas. The gradability approach (Villalta 2009) will also have trouble explaining the subjunctive in this set of facts, as again these do not involve preference ordering, but are rather about existence. I will not go into more details here (see Giannakidou 1998: chapter 2 for more data and discussion).

In sum, in this section, we saw the following facts about the Greek subjunctive (*na*+PNP):

(i) *Na*+PNP is selected by volitional, directive, and modal verbs, and generally future oriented propositional attitudes that do not commit the speaker or the main clause subject to the truth of the *na* complement.
(ii) *Na*+PNP is selected by connectives such as *prin* 'before' and *xoris* "without", and is excluded with *afu* "after". Again, there is no commitment of the speaker to the truth of the *na*+PNP clause.
(iii) *Na*+PNP can be triggered under negation, and in relative clauses. *Na* triggering again suspends truth commitment, and existence (in relative clauses).
(iv) The *na*+PNP clause is never factive in Greek. Factive verbs in Greek alternate between the two kinds of indicative complements.
(v) *Na*+PNP allows NPIs and FCIs, but indicative complements don't.

These five generalizations must be captured by a successful theory of the subjunctive in Greek, and the *na* clause is not compatible with full commitment to the truth of a sentence.[3] This is what I tried to capture in the notion of nonveridicality that we study next.

4. (Non)veridicality, Subjective Truth Assessment, and Mood

In this section I develop a formal system (section 4.1) within which to understand the distribution of the subjunctive and indicative in Greek. In sections 4.2. and 4.3, I discuss the veridicality and nonveridicality properties of some of the basic propositional attitude verbs that we discussed thus far, in particular, belief, dream, volitional, and factive verbs. In section 4.3. I will also tackle the problem of implicative verbs like *kataferno* 'manage', which select the subjunctive, and show that the choice of subjunctive is not inconsistent with the nonveridicality hypothesis, although it may appear to challenge it at first glance.

4.1. Giannakidou (1998, 1999): Subjective truth assessment and nonveridicality

Montague (1969) used the term *veridicality* for the verb *see*: *see* is veridical because if *I see a unicorn* is true then a unicorn exists.[4] The notion was further defined based on truth, and its relevance for PI-licensing has been developed in Zwarts (1995), Giannakidou (1998, 1999, 2001, 2006, 2009) for various kinds of PIs and mood choice, and Bernardi (2002) who implemented a (non)veridicality calculus in a categorial type logic for PI-licensing in Italian. In what follows here, I will summarize from those discussions.

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[3] There appear to be three 'exceptions': the use of *Na*+PNP with implicative verbs (*kataferno* 'manage"), verbs of perception (*John saw Mary dance*), and aspectual verbs like *arxizo* 'start' (*It started raining*) (Giannakidou 1997, 1998). I will offer an analysis of the implicative consistent with the nonveridicality hypothesis in section 4.3. With verbs of perception and aspectuals – which take 'smaller' complements in English, I argued that *na* is chosen because the *na* clause is the only small complement in Greek, since Greek lacks infinitives (Giannakidou 1998).

The intuitive idea behind veridicality and nonveridicality is very simple: a linguistic item L is veridical if it expresses certainty about, or commitment to, the truth of a sentence; and L is nonveridical if it doesn't express commitment. For example, if *We know that Bill left* is true then *Bill left* is true – in fact *Bill left* is not simply entailed in the context, but presupposed to be true, i.e. it is part of the context's common ground. Hence all factive verbs are veridical. But if it is true that I have a desire that *Bill leaves*, I am not committed to the truth of *Bill leaves.* From this intuitive description, we see immediately that veridicality and nonveridicality correlate with the two basic categories of the indicative selecting verbs (factives), and the subjunctive ones (volitionals). In Giannakidou (1998) and (1999) I developed a formal system that described these distinctions, and I will reproduce part of that discussion here.

The notion of certainty and uncertainty that I employ here is one of epistemic assessment, and epistemic assessment itself relies on an *individual* assessing whether the proposition denoted by a sentence is true or false. This individual is the *individual anchor* (Farkas 1992, Giannakidou 1998, 1999), and I made the assumption that *every sentence*, embedded or not, is true or false with respect to an individual. An unembedded sentence will be assessed as true or false with respect to the speaker. With propositional attitudes (which are propositional operators, a treatment originating in Hintikka 1962), we have two possible individual anchors for truth assessment: the speaker, as in the unembedded sentence, and the attitude subject; and the complement sentence may be true or false depending on whose perspective we take.

It is clear from this set-up that I am taking a *subjective* stance on the task of truth assessment. Harris/Potts (2010: 1) express a similar view in saying that: "We say that a clause C with denotation p is speaker-oriented in utterance U if, and only if, in uttering U, the speaker expresses, with C, *a commitment* to p. For example, if I utter the clause *Ohio is the birthplace of aviation* with the intention of sincerely asserting it, then I express, in virtue of this utterance, my public commitment to the proposition that *Ohio is the birthplace of aviation*. Thus, *Ohio is the birthplace of aviation* is speaker-oriented in this case." (Harris/Potts 2010: 1-2).

In Giannakidou (1997, 1998, 1999) I added to the context 'models of individuals'. These models represent the doxastic state of individuals, as in the philosophical tradition where belief and knowledge states are modeled as sets of possible worlds in terms of accessibility functions relative to individuals (see Hintikka 1962 and Heim 1992, among many others).

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[4] Truth and existence are obviously related – as can be seen in the nonveridicality of determiners (Giannakidou 1998, 1999), and subjunctive relative clauses. It was also suggested by Lin 1996 that the notion of non-existence is relevant for Chinese NPIs, with examples similar to the ones I discussed in my own work on Greek. Existence can be derived from truth: if the truth of a sentence is not guaranteed in a world, existence of the event participants will likewise be suspended in that world.

(51) *DF*1: Model of an individual (Giannakidou 1999: (44))
Let c = <cg(c), W(c), M, s, h, w_0, f,…> be a context.
A model M(*x*) ∈ M is a set of worlds associated with an individual *x*; *x* is the individual anchor.

The context assumed in this definition is Stalnakerian. It is a tuple consisting of a common ground (cg(c)), a context set W(c), i.e. the set of worlds in which all the propositions in the cg(c) are true (i.e. it is the set of worlds compatible with that is believed to be true by the agents of the conversation prior to any assertion), an assignment function *f*, and a number of what Condoravdi calls *Kaplanian* (Condoravdi 1994) parameters such as the speaker *s*, the hearer *h*, the actual world w_0, and possibly other parameters. Models are construed as collections of worlds in *c*, corresponding essentially to the accessibility functions we know from the treatment of attitudes in modal logic and possible world semantics. (Farkas 2003 uses the similar function "worldview").

In the simplest case, i.e. for an unembedded assertion, and for sentences embedded under epistemic verbs as we shall see in section 4.2, M(x) stands for an individual's belief state: it represents the epistemic status of that individual, and it includes worlds compatible with what x believes in the actual world. This is captured in the definition below, where M(x) is indexed with B:

(52) *DF*2: Belief model of an individual (Giannakidou 1999: (45))
Let c = <cg(c), W(c), M, *s, h*, w_0, *f*,…> be a context.
A model $M_B(x)$ ∈ M is a set of worlds associated with an individual *x* representing worlds compatible with what x believes.

The proposition *p* of an unembedded assertion will be evaluated with respect to the speaker's model, naturally:

(53) a John won the race.
b ⟦John won the race⟧=1 iff
$\forall w\,[w \in M_B(s) \rightarrow w \in \lambda w'.\text{John wins the race in } w']$

This tells us that if the speaker decides in a context to truthfully assert the sentence *John won the race*, (s)he must believe that John won the race, which means that all worlds in his model M_B (s) are *John-won-the race* worlds. Hence: $M_B(x) \subseteq p$:

(54) *DF*3: Truth in an epistemic model
A proposition p is true in an epistemic model $M_B(x)$ iff:
$\forall w\,[w \in M_B(x) \rightarrow w \in \lambda w'.p(w')]$

So, unembedded assertions express speaker commitment. This is formalized in some recent works (e.g. Alonso-Ovalle/Menendez-Benito 2010) by introducing an implicit assert operator in the syntax that brings in the $M_B(x)$, but in Giannakidou (1998, 1999), $M_B(x)$ remains a parameter of evaluation that is not syntactically present. The question of whether $M_B(x)$ needs to be syntactically present or not parallels the debate about whether the *judge* (Lasersohn 2005), the individual anchor for predicates of personal taste, must be represented syntactically as a covert pronoun (as in Stephenson 2007) or not. The debate is not central to what we discuss here though, so I leave it aside.

Unembedded positive assertions in the simple past, then, like *John won the race,* are veridical. We are now ready to define the notion:

(55) *DF*4. (Non)veridicality for propositional operators (following Giannakidou 2006)
i. A propositional operator *F* is veridical iff *Fp* entails or presupposes that *p* is true in some individual's model M(x); p is true in M(x), if $M(x) \subset p$.
ii. If (i) doesn't hold, *F* is nonveridical.
iii. A nonveridical operator *F* is *anti*veridical iff *Fp* entails *not p* in some individual's model: $Fp \rightarrow \neg p$ in some M(x).

Given that a proposition *p* is true in a model M(x) iff it is true in all worlds in M(x), *DF*4 says that an expression *F* will be veridical if the proposition of the sentence F embeds is universally true in all worlds in M(x). So veridical operators express an individual's commitment to the truth of a proposition. Nonveridical expressions, on the other hand, lack such commitment: it is not the case that all worlds *w* in M(x) are *p*-worlds. This is typically what we get with volitional and future oriented predicates, as we see in section 4.3.

Within the class of the nonveridical functions, negation is identified as ANTI-VERIDICAL*:* assertion of *NOT p* requires that the set of worlds in M_B(speaker) and the *p* worlds are disjoint:

(56) *Antiveridicality* of negative assertion
[[not p]] is true in M_B(speaker) iff $M_B(\text{speaker}) \cap p = \varnothing$

Negation, disjunction (Zwarts 1995), imperatives, questions, are all nonveridical (Giannakidou 1998, 1999), and licensing environments for NPIs in Greek. Giannakidou (1998) used the term *averidical* (with Greek *a-* meaning *without*) for non-assertive sentences such as imperatives and questions because for their assessment we do not use the concepts of truth or falsity, hence they lack veridicality. Since then, I am using the term nonveridical to include the nonveridical and averidical cases, since the latter too, strictly speaking, do not require satisfaction of clause (i), i.e. truth in a speaker's model.

I showed in my earlier work that the nonveridical functions license negative polarity items (NPIs); and in the present paper my focus is to show that they also license the subjunctive. I continue now with describing in some more detail first the veridicality properties of some of the attitudes we saw earlier. I should also mention that Quer's (1998, 2001) account of mood in Spanish and Catalan implements the notion of model that I define here, and suggests that the availability of multiple models is the key to licensing the subjunctive in Romance. I am not convinced that this extends to the polarity subjunctives with negation and in relative clauses, but I think it is important to mention this implementation of the system I outlined here.

4.2. Indicative and veridicality

When it comes to sentence embedding, Giannakidou (1998, 1999) argues that epistemic attitudes are veridical. For *x believes that p* to be true, it must be the case that *x*, the main clause subject, is committed to the truth of the embedded proposition *p*. Though the speaker might disagree, a prerequisite for *p* to be true is that Jacob's epistemic model (i.e. the set of worlds compatible with what Jacob believes) be a subset of the worlds where *p* is true:

M_E(Jacob) $\subseteq$ p. The speaker may believe or even know that what Jacob believes is false, but this is irrelevant for Jacob's beliefs.

(57) a. $[\![\text{Jacob believes that Ariadne kissed Bill}]\!]_c = 1$ iff
$\forall w\ [w \in M_B(\text{Jacob}) \rightarrow w \in \lambda w'.\text{Ariadne kissed Bill in } w']$
b. Veridicality of the epistemic verb
If *believe (x, p)* is true in a context c, then M_B (x) $\subset$ p in c

Since all worlds in the model M_B(Jacob) are *p*-worlds, *believe* is veridical: M_B(Jacob) $\subset$ *p*. And since the indicative is used in both unembedded assertions and in the complement of belief verbs, we can argue that indicative in Greek is chosen for sentences whose proposition is judged as true in an individual model. The sentences can be true at a past time (as in the examples I illustrated earlier in section 3), or in the present time as here, or in a future time, since *tha* embeds under *oti*: *I Maria pistevi oti tha figoume avrio* 'Mary believes that we will leave tomorrow'.

Other veridical predicates besides *pistevo* 'believe' are verbs of dream/fiction and verbs of saying. In Giannakidou (1998, 1999) I defined a dream model of an individual M_D(x), which includes worlds compatible to what x dreams or imagines:

(58) *DF*5: Dream model of an individual (Giannakidou 1999: (46))
Let c= <cg(c), W(c), M, s, h, w_0, f,…> be a context.
An model $M_D(x) \in$ M is a set of worlds associated with an individual *x* representing worlds compatible with what x dreams.

Crucially, the worlds compatible with one's beliefs need not be, in fact are not, identical to the worlds compatible with one's dreams. $M_B(x)$, the belief model of x, and $M_D(x)$ the dream model of x, single out different (but possibly intersecting) sets of worlds with respect to the same individual. In Giannakidou (1999) I also noted that although $M_B(x)$ can be viewed as a doxastic extension of the actual world, $M_D(x)$ isn't such an extension (Giannakidou 1999: 387). This echoes an earlier observation by Farkas (1992) that with dream/fiction verbs a fictional reality replaces the actual one. At any rate, in the dream model of the subject, all worlds w are p-worlds, hence again we have veridicality:

(59) a. $[\![\text{Jacob dreamt that Ariadne kissed Bill}]\!]_c = 1$ iff
$\forall w\ [w \in M_D(\text{Jacob}) \rightarrow w \in \lambda w'.\text{Ariadne kissed Bill in } w']$
b. Veridicality of the dream verb
If *dream (x, p)* is true in a context c, then M_B (x) $\subset$ p in c

For assertive verbs like *leo say, isxirizome,* etc. we need to view the model as conceptualizing the reported conversation, illustrated below in the index RC. Under realistic assumptions, M_{RC}(x) includes worlds different from M_D(x) and M_B(x):

(60) *DF*6: Model of reported conversation for an individual (Giannakidou 1999: (47))
Let c = <cg(c), W(c), M, s, h, w_0, f,…> be a context.
A model $M_{RC}(x) \in$ M is a set of worlds associated with an individual *x* representing worlds compatible with what x takes the reported conversation to be in the context.

For more recent ideas on reported context see Schlenker (2003), but it is not necessary for the present paper to go into more detail, as I do not see an incompatibility between Schlenker's findings and veridicality. What I do see worth emphasizing is that, as I said in

Giannakidou (1998, 1999), the models we employ here, though distinct, are all epistemic in a more general sense: what one dreams represents the state of belief while dreaming, what one takes the reported conversation to be represents one's belief state regarding the reported conversation. Broadly speaking, by saying that truth assessment is done with respect to an individual's model, we are saying that we are always relying on an individual's doxastic state.

Factive verbs, furthermore, are *strongly* veridical (Giannakidou 1999): the worlds in the speaker's model too are *p*-words, consistent with the observation that factive complements are presupposed to be true (see Giannakidou 1998, 1999 for more discussion).

(61) $[\![\text{Jacob knows/regrets that Ariadne kissed Bill}]\!]_c = 1$ iff
i. $\forall w\,[w \in M_B(\text{Jacob}) \rightarrow w \in \lambda w'.\text{Ariadne kissed Bill in } w']$; and
ii. $\forall w\,[w \in M_B(\text{speaker}) \rightarrow w \in \lambda w'.\text{Ariadne kissed Bill in } w']$
iii. Veridicality of the dream the factive verb
If {*know/regret (x, p)*} is true in a context c, then $M_B(x) \subset p$ in c,
and $M_B(\text{speaker}) \subset p$ in c.

Hence, the choice of indicative for Greek factives is consistent with the fact that they presuppose truth commitment (veridicality). In Romance, where factives select the subjunctive for this presuppositional use, one needs a different kind of explanation (see Quer 2001 for some ideas consistent with model shifts). Let us move on now to the nonveridical predicates.

4.3. Nonveridicality and the subjunctive

The three core classes of subjunctive selecting verbs, volitionals, directives, and modals are nonveridical: they do not require an individual's commitment to the truth of the embedded proposition, and express a weaker relation between the speaker and the embedded proposition. I will not consider modal verbs here (see Giannakidou 1998: chapter 3), but I will elaborate on the volitional class, and offer some new discussion on what may appear as a problematic case at first, namely the use of subjunctive with implicative verbs (in Greek as well as Romance).

A. Volitionals and other directives
Consider *thelo* 'want'. The truth condition for *thelo* simply requires that the intersection between $M_E(x)$ and *p* be non-empty:

(62) $[\![\text{Jacob wants that Ariadne leave}]\!]_c = 1$ if
$\exists w\,[w \in M_B(\text{Jacob}) \wedge w \in \lambda w'.\text{Ariadne leave in } w']$

If *x wants p* it is not the case that all worlds in $M_B(x)$ are also *p*-worlds. *X wants p* simply requires that there is a some world *w* in $M_B(x)$ that is also a *p*-world. We can thus envision $M_E(x)$ as partitioned into two sets, W_1 and W_2. W_1 is the part that intersects with *p*. W_2 is the part containing non-*p* worlds: therefore $W_2 \cap p = \emptyset$. So, *thelo* 'want' is nonveridical:

(63) Nonveridicality of the volitional verb
If *thelo (x, p)* is true in a context c, then $M_B(x) \cap p$ is not $\emptyset$ in c 'want'

Likewise, other directive verbs such as ‘ask’, ‘suggest’, ‘hope’ etc:

(64) a. If *suggest (x, p)* is true in a context c, then $M_B(x) \cap p$ is not $\varnothing$ in c
b. If *hope (x, p)* is true in a context c, then $M_B(x) \cap p$ is not $\varnothing$ in c
c. If *ask (x, p)* is true in a context c, then $M_B(x) \cap p$ is not $\varnothing$ in c

These are all (sometimes future oriented) verbs which require simply that the intersection $M_B(x) \cap p$ be non-empty. This is nonveridicality. The semantics of modal verbs follow the same pattern (see Giannakidou 1998, chapter 3): the modal base (MB) is part of $M_B(x)$. With necessity modals it is not the case that $M_B(x) \subset p$, and with existential modals it is not even the case that the MB $\subset$ p.

The semantics for *want*, modals, and the other directives I propose in my work uses an epistemic model, not a bouletic one, it thus assumes that what one desires depends on what one believes – a connection often made in the literature on desire reports (Stalnaker 1984, Asher 1987, Heim 1992). The connection is done usually in terms of preference: specifically, Stalnaker claims that “wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants” (Stalnaker 1984: 89). Heim 1992, building on this position, poses that *x wants p* is true if John prefers *p* to *not p*, as can be seen in her definition below:

(65) [Heim 1992: 193]
“α wants that ϕ’ is true in w_0 iff for every $w \in \text{Dox}(\alpha)(w_0)$:
every ϕ-world maximally similar to w is more desirable to α in w_0 than any non-ϕ world maximally similar to w.”

Dox (α) (w) is the accessibility function determining a set of doxastic (epistemic) alternatives for α; in other worlds, it is $M_B(x)$. Villalta (2008) proposes the following semantics for *want*:

(66) Semantics of *want* based on comparison of alternatives
$[[want_C]]^g(p)(a)(w) = 1$ iff
$\forall q: q \neq p \ \&\ q \in g(C): \text{Sim}_{w'}(\text{Dox}_a(w) \cap p) >_{a,w} \text{Sim}_{w'}(\text{Dox}_a(w) \cap q)$

Notice that the semantics derives a nonveridical *want*, just like we do. But Villalta claims that it is this ordering semantics that unifies subjunctive selecting contexts Spanish (she does not consider nonveridicality), and that cannot be true. Volitionals do have the preference dimension in their meaning in addition to being nonveridical, but it is questionable whether *all* subjunctives depend on preference orderings. Certainly, modal verbs *prepi* ‘must’ and *bori* ‘can’ do not; and we also saw that the subjunctive is licensed with *before* and *without*, negation and in relative clauses. In these contexts there is no preference ordering. Nonveridicality, on the other hand, makes the right generalization about mood choice and captures easily all these cases.

I will show next that even what appears a recalcitrant case, i.e. subjunctive selection after implicative verbs, manifests a nonveridical component in the meaning of the implicative.

B. Implicatives and nonveridicality
Consider a sentence with *kataferno* 'manage':

(67) I Maria **katafere** **na** ftiaksi to aftokinito.
Maria managed.3sg SUBJ fix.3sg the car
Maria managed to fix the car.

(68) Kartunnen's 1971
Manage p entails p, and presupposes that it took (some or considerable) *effort to do p*.

Since *manage* p entails p, manage appears to be veridical. However, manage verbs select the subjunctive systematically in a number of languages. Why is that?

The key to understanding this *prima facie* unexpected behavior of *manage* verbs is to appreciate the effort component: effort implies trying, and *trying to do p* does not entail *having done p* at every instance of trying. I will suggest then that the implicative meaning MANAGE is a complex meaning *TRY to do p and p.* Some motivation for this comes from the fact that, at least in Greek, the implicative appears with *ke* 'and', a paratactic complement (Giannakidou 1998, Giannakidou/Staraki 2010):

(69) I Maria **katafere** **ke** eftiakse to aftokinito.
Maria managed.3sg and fix.PNP3sg to car
Maria tried [to fix the car] and did fix the car.

The occurrence of this paratactic complement with *ke* remained mysterious in the Greek literature, but I think it is suggestive of the richer implicative meaning that I am proposing, and which has two components: a trying event, and a successful result state:

(70) Implicative meaning
[[x TRY to DO p and p]] is true iff:
$\exists t\ \exists e\ [[\text{try}\ (e, x, \text{do}\ p) \wedge e \subseteq t \wedge \text{agent}\ (e, x)] \wedge \exists s\ \exists t'\ [\ t < t' \wedge \text{BE-fixed}\ (\text{car}, s, \text{at}\ t')]]$

From this condition, it follows that the car is fixed only at the time *t'*, which follows the time *t* of the trying event. If this is the meaning of MANAGE, then in assessing the truth of a sentence *MANAGE p,* the speaker is also accessing the trying times (or world/time pairs), prior to the final result, and at the trying worlds/times there is no fixing the car. In the epistemic model of the x too, it is not the case that every world is such that x fixed the car: there are worlds W_{try} – the belief worlds of x at the time of trying – where x has not yet fixed the car. The car being fixed is the result state temporally *following* the trying event, and from the point of view of x, the fixing of the car does not characterize all his belief worlds but only the ones after the end state. Hence:

(71) If *manage (x, to do p)* is true in a context c, then $\exists W\ [W_{try} \subset M_B(x) \wedge W_{try} \cap p = \emptyset]$,
where W_{try} are the belief worlds of x at the time of trying;
Thus, if *manage (x, to do p)* is true in a context c, then it is not the case that $M_B(x) \subset p$.
(nonveridicality)

Thus, belief states must be relativized to times in order to appreciate the nonveridicality of the implicative. Kartunnen insisted that *John managed to fix the car* is not equivalent to the simple assertion *John fixed the car*, and though what I sketched here is a rough idea of how this should be modeled (see Giannakidou/Staraki 2010 for more), it is important to note that the complex implicative meaning I defined in (71) characterizes a larger set of action sentences in Greek as well as in English, including actions that involve ability predicates such as ABLE.

To conclude, I offered in section 4 an account of mood phenomena in Greek based on the notion of (non)veridicality. I showed that this account not only explains the core mood selection patterns in complement and adjunct clauses, but it also predicts a correlation with NPI licensing that remains unexpected in other current theories of mood alternations, and unifies polarity and 'canonical' subjunctive. The essence of the proposal has been that, like polarity items, the subjunctive is a dependent form that, at least in Greek, marks the nonveridicality of a sentence.[5]

Before moving on to the final question of the dependency, I want to point out the similarity between my (non)veridicality account, and the notion of decidedness of Farkas 2003:

(72) Deciding an issue (Farkas 2003: (19))
Let W_i be a set of worlds, and S a sentence with propositional content p,
i. S is *positively decided* in W_i iff $W_i \subset p$.
ii. S is *negatively decided* in W_i iff $W_i \cap p = \emptyset$.
iii. S is decided in S W_i iff either (i) or ii); otherwise S is *undecided* in W_i .

A mere glance at these definitions makes evident the similarity to nonveridicality. A sentence is decided within a set of worlds (Farkas's *worldview*). It is positively decided if all worlds in the set are p-worlds (veridicality); negatively decided if p and the set are disjoint (antiveridicality); and undecided if it is not positively or negatively decided (nonveridicality). Farkas thus also utilizes truth; the only difference is that I am defining nonveridicality as a property of expressions that guarantee truth of a sentence, but Farkas is definining it directly on the sentence. Bringing the two together: a sentence is positively decided in the scope of a veridical operator, negatively decided in the scope of an antiveridical operator, and undecided in the scope of a nonveridical operator.

It is further stated that "The complement of desideratives is added to the subject's epistemic context, but the addition is *not assertive. It does not result in the complement being decided in any context.*" (Farkas 2003: 12). Farkas here collapses non-assertiveness with undecideness (nonveridicality), thus implying that non-assertive contexts will be nonveridical. This is exactly what Giannakidou (1997, 1998, 1999) states (and we mentioned earlier) about nonassertive speech acts (questions or imperatives, which are nonveridical). Crucially, however, negation *is* assertive – but it does have an effect on subjunctive, i.e. it triggers polarity subjunctive, and also triggers NPIs. So, non-assertiveness, unless connected to (non)veridicality, does not give us the appropriate tool to capture mood choice and NPI licensing, and in Giannakidou (1997: 142-143) I rejected it. Nonveridicality predicts sensitivity of mood and NPI licensing to non-assertiveness, while also predicting dependency to negation, modality etc. which are nonveridical but nevertheless assertive.

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[5] Importantly, this view is similar to Giorgi and Pianesi's claim that "the relationship between grammatical mood and notional mood is an interpretive one: a given grammatical mood *is interpreted as signaling that the clause it appears in must be evaluated in a semantic environment having certain properties*." (Giorgi and Pianesi 1997: 211).

The next, and final, question to address is the dependency of the subjunctive, as it is manifested in the relation between *na* and the PNP.

5. The Meaning of Subjunctive: the Subjunctive as Containing a Non-deictic Time

Now that we have established that the subjunctive is used in nonveridical sentences, we can ask the question: what is the relationship between the two forms used in Greek? Why does the PNP need *na*? Understanding this relation will help us see why the two forms appear in nonveridical contexts only.

A common idea has been that the subjunctive is modal (Roussou 2000) or futurate, and it is true that the subjunctive clause often comes with future orientation (even with implicatives, as we saw earlier). Notice, however, that future orientation is not always the case—recall *xoris* 'without':

(73) I Ariadne milise **xoris** na xrisimopiisi mikrofono. (*without*)
the Ariadne talked.3sg without subj use.PNP.3sg microphone
'Ariadne talked without using a microphone.'

I will follow my earlier work (Giannakidou 2009) and argue that the contribution of the subjunctive is temporal, but that the subjunctive itself has nothing to do with the future. I will start by explaining the dependency of the verbal form, and then show why *na* is necessary.

5.1. Tense and aspect in Greek

The Greek verb is obligatorily inflected for tense and aspect. The four possibilities for the verb *grafo* 'I write' are given in (74) (cf. Mackridge 1985; Holton et al. 1997):

(74) a. graf- -o (INP)
write.**imperf** -1sg.nonpast
'I am writing (right now).'
'I write (generally).

b. grap- s- -o (PNP)
write- **perf**.1sg.nonpast
[no English equivalent]

(75) a. e- graf- -a (IP)
past- write.**imperf**. 1sg.past
'I used to write.'
'I was writing.'

b. e- grap- s- a (PP)
past- write- **perf**.1sg.past
'I wrote.'

The basic temporal opposition is between a morphological past, which is usually marked by the prefix *e-* attaching to the verbal stem and specific inflection, and the nonpast which is signalled by the absence of the prefix *e-* (hence the label *nonpast*), and which has its own inflection. The nonpast is *not* equivalent to a present, as will become evident soon.

Following standard assumptions (and I am relying here on Kamp/Reyle 1993; von Stechow 2002; Giannakidou 2003, 2009), I will take it that perfective aspect (*Aktionsart* will be ignored; see Giannakidou 2003, 2009) is a lower function that applies to the verb meaning first; then tense is applied. In order to achieve simpler types and syntactic structures, I am also assuming that the subject is in VP at least at LF, an assumption fully consistent with the fact that the Greek subject is generated in this position. Greek exhibits verb movement to T in declarative clauses, but for the purposes of semantics, V is interpreted inside the VP, just like in English. The T head gives temporal information, specifically temporal orientation (a time prior to the utterance time for the past morpheme; for the nonpast we see below). Following Abusch (2004) and others, I will also assume that the tenseless VP is a time abstract of type *i,wt* (for *i* the type of a time interval, and *wt* the type of propositions).

According to Comrie (1976:16) "perfectivity indicates the view of a situation as a single whole, without distinction of the various separate phases". The Greek perfective exhibits the typical eventive meaning associated with the perfective: it creates statements that involve existential quantification over events. (And it implies no telicity; Giannakidou 2003). I will thus treat perfective aspect, quite standardly, as the modifier function below: it takes the VP meaning P as its input and gives back a predicate of times such that an event characterized by P is included in those times:

(76) $[\![\text{PFT}]\!] = \lambda P\, \lambda t\, \exists e\, [\, P(e) \wedge e \subseteq t\,]$

The condition ‘$e \subseteq t$’ (Kamp/Reyle 1993) expresses that *e* takes place, or is included, at t. A typical sentence with past perfective is interpreted episodically:

(77) a. I Ariadni **filise** ti mama.
Ariadne kiss.PP.3sg the mommy
‘Ariadne kissed mommy.’
b. $\exists e\, [\textbf{kiss}\,(\text{Ariadne, mommy}, e) \wedge t<n \wedge e \subseteq t]$

Imperfective aspect in Greek, on the other hand, is used for habitual and generic statements, as well as to denote progressive and ongoing events, as is common crosslinguistically. I will not discuss the imperfective here at all (see Giannakidou 2009 for details).

Regarding tense, I will assume the pronominal theory of tense (originating in Partee's 1973, 1984 seminal work; see also Heim 1994; Abusch 1998, 2004, and others). Tenses contribute temporal variables, and they also give temporal orientation. E.g. a past tense denotes anteriority: it refers to a time prior to the utterance time, designated here as *n:*

(78) $[\![\text{PAST}]\!]^{g,c}$ is defined only if $g(t) < n$, in which case $[\![\text{PAST}]\!]^{g,c} = g(t)$

I am following Heim in representing the orientation as a presupposition. As pronominal elements, times can also be bound, for instance by existential quantifiers as in Bäuerle (1979), von Stechow (1992), and Kratzer (1998). The past tense, as suggested above, expresses anteriority with respect to *n*, and this is what makes the past function a ‘real’, independent tense. A perfective past sentence in Greek then is derived as follows:

(79) **Kerdise** o Janis.
won.PP.3sg the John
'John won.'

(80) TP: $\exists e$ [win (j, e) $\wedge$ e $\subseteq$ PAST]
/ \
T^0: AspectP: $\lambda t\, \exists e$ [win (j, e) $\wedge$ e $\subseteq$ t]
kerdise / \
PAST Asp^0: VP: λt win (t, j)
PFT= t_v o Janis
$\lambda P\, \lambda t\, \exists e$ [P (e) $\wedge$ e $\subseteq$ t]

Aspect operates on the verb meaning first. The output of aspect serves as the input to Tense, which fills the interval argument (following Abusch 2004:37), in this case with the PAST. So, a typical sentence with past perfective is interpreted episodically, and the past tense specifies independently a relation to the utterance time: anteriority.

Let us see now what the contribution of nonpast is, and what goes wrong when we combine it with perfective aspect.

5.2. What goes wrong with perfective nonpast?

I argued in Giannakidou (2009) that the Greek PNP cannot make reference to the utterance time, as is usually assumed to happen with apparent present tenses. In other words, Greek nonpast does not function as a present tense.[6] Instead, the PNP denotes an interval whose left boundary is a dependent (Giannakidou 1998), *non-deictic* variable t. The presence of such a variable renders an expression polarity sensitive because a dependent variable will come with conditions on its use; and I have argued (Giannakidou 1998) that the existence of such a variable plays an important role in the formation of NPIs crosslinguistically.

A non-deictic variable cannot be interpreted as a free variable:

(81) *Non-deictic variables* (Giannakidou in press: (109))
A variable *x* is non-deictic iff *x* cannot be interpreted as a free variable.

This means that a non-deictic variable cannot pick up contextual values by default, like regular variables do. An item containing such a variable will be referentially deficient, or non-referential, and will thus depend on another element in the sentence for reference. Greek NPIs such as *kanenas* (that we talked about in section 3) contain type *e* non-deictic variables of this kind. Free choice items like *opjosdhipote* that we also saw in section 3 contain type *i* (world) non-deictic variables (Giannakidou 2001, Giannakidou/Cheng 2006). Here I am extending the analysis to identify the PNP as a polarity item containing a non-deictic temporal variable whose presence renders the PNP a dependent form. I will propose the following semantics for nonpast.

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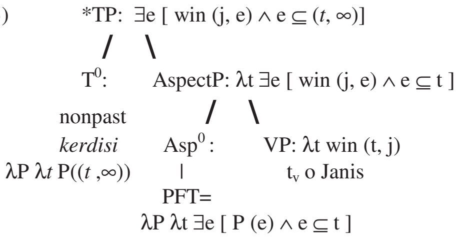
[6] With the exemption of auxiliary verbs where there is no aspectual distinction. With imperfective forms, reference to the utterance time is done indirectly (Giannakidou 2009).

(82) $[\![\text{nonpast}]\!] = \lambda P\, \lambda t\, P((t, \infty))$

This semantics is inspired by Abusch's (2004) analysis of *will* as a substitution operator. According to Abusch, “in the substitution operator, *t* is a bound variable that corresponds to the tense argument of *will* [which is *n*, coming from the higher PRES; clarification mine]. For a top-level occurrence of *will,* the effect is to substitute (n, ∞) for *n*” (Abusch 2004:39). However, with the Greek nonpast we will not be able to do this substitution because, unlike *will,* which is decomposed into the substitution operator plus PRES supplying *n* (Abusch 2004: (48)), the Greek nonpast contains no higher temporal information, that is, no PRES, it will thus require some other element to supply *n*; without it, *t* remains free at the top. But *t* is, as Abusch puts it, a *bound* variable, and as such it cannot be left free. In this case, the structure becomes ill-formed:

(83)

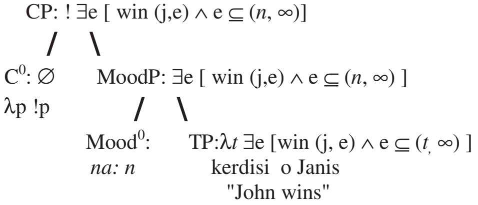

*TP: ∃e [win (j, e) ∧ e ⊆ (t, ∞)]
T0:
nonpast
kerdisi
λP λt P((t ,∞))
AspectP: λt ∃e [win (j, e) ∧ e ⊆ t]
Asp0 :
PFT=
λP λt ∃e [P (e) ∧ e ⊆ t]
VP: λt win (t, j)
tv o Janis

The interval (t, ∞) lacks temporal orientation, because *t* lacks reference to a time: it can only be interpereted as bound viariable, and there is nothing above nonpast to bind it. A kind of default rule that would give the utterance time as its value would not work either, because it doesn’t supply a real binder. The PNP form must therefore rely on another element in the sentence to give a value to *t*. This is why the PNP must be ‘licensed’.

Given the dependent nature of nonpast and its inability to function as a PRES and introduce *n*, it becomes necessary to introduce *n* in some other node in the clause. With the indicative, the designated node is Now-TP which hosts *tha*; but in the subjunctive clause *tha* is not projected (*na* and *tha* are incompatible; Giannakidou 2009, Roussou 2000, and references therein), so *n* will be given by the next inflectional head above TP: Mood.

(84) $[\![\text{na}]\!] = n$

(85)


CP: ! ∃e [win (j,e) ∧ e ⊆ (n, ∞)]
C0: ∅
λp !p
MoodP: ∃e [win (j,e) ∧ e ⊆ (n, ∞)]
Mood0:
na: n
TP:λt ∃e [win (j, e) ∧ e ⊆ (t, ∞)]
kerdisi o Janis
"John wins"

Na thus functions as PRES in a subjunctive clause. Given that in indicative clauses *n* is given by *tha,* an additional overt exponent in Mood becomes redundant, and this is, I believe, why there is no overt indicative particle in Greek. Here *n* is introduced by the

Mood head which hosts *na*. In the absence of a modal or adverbial or a question particle, at C^0 we have the operator that gives the illocutionary force of a request or a command: $\lambda p\ !p$.

In other words, particle subjunctives, and related particles in Balkan languages (I would suppose), have the PRES-like function of introducing *n*, and are always embedded, even in main clauses – since they are under the force operator (or, as we saw in Greek, an epistemic modal operator) in C. When embedded under a verb, *na* gives the internal now of the attitude. There is more detailed consideration of specific embedded examples in Giannakidou (2009), and for reasons of space I close the present discussion here.

6. Conclusions

The main conclusions to be drawn from this work are the following. First, subjunctive selection in Greek manifests lexical sensitivity to nonveridicality. The cases of canonical (selected) as well as non-canonical (triggered) subjunctives, at least in Greek, seem to follow this pattern – and evidence from Russian adduced in Borchev et al. (2008) suggests the same for Russian. The sensitivity of subjunctive to nonveridicality also helps us make sense of the fact that polarity items are licensed in subjunctive clauses (if the language allows the mood distinction) or under nonveridical elements – verbs, as well as adjuncts such as *before* and *without.* In order to be successful, a semantic account of mood selection must be able to connect these three facts – selection by verbs and adjuncts, non-canonical triggering by negation and in relative clauses, polarity item licensing – and, as far as I can tell, the other accounts currently on the market cannot.

Another way of summarizing our findings is to say that the sensitivity to nonveridicality is a phenomenon grammaticized in at least three ways (mood selection, mood triggering, and NPI licensing). If a language does not have mood distinctions, e.g. English, we are bound to see on the latter; in a language like Greek, we can see all three.

In answering the question of why the subjunctive is dependent, I suggested that there is a deep deficiency in Greek in what appears as a potential present (PRES) form, the PNP. The PNP contains a non-deictic temporal variable that cannot be interpreted by default referring to the utterance time. The presence of this variable renders the PNP unusable in veridical contexts. In order to use PNP, it becomes necessary to introduce PRES in a higher node. In the indicative, there is a designated node that does this job: Now-T, occupied by *tha*. In the subjunctive, the PRES function is done by *na*, whose contribution, I thus argued, is just temporal. The subjunctive is therefore indeed a ‘deficient’ tense (Picallo 1985), but in Greek the deficiency is manifested as a relation between two positions in the tree. In main clauses, both of these positions (*na* and the PNP) remain embedded under the (deontic, epistemic, or interrogative) operator in C.

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B. Understudied Tense Phenomena and Typological Variation

Cheng-Fu Chen

Use and Temporal Interpretation of the Rukai Future Tense[1]

1. Introduction

This paper provides a tense analysis of the future marker in a future/nonfuture system drawing data from Rukai. By examining its interaction with negation, aspectual markers and modals, this study argues that the future marker in a future/nonfuture system can be a real tense.

Rukai is an Austronesian language spoken in the southern and southeastern parts of Taiwan, which include Kaohsiung, Pingtung and Taitung Counties where at least fourteen villages have been identified as residing (Gordon 2005). Geographically speaking, the Rukai tribe consists of three branches that speak six dialects: Budai, Labuan, Maga, Mantauran, Tanan and Tona (Li 1977, 2001). This paper investigates the Budai Rukai dialect.

The future tense locates temporally the eventualities at a time that is in the future of the speech time (Comrie 1985). The semantic effect of such temporal location is that the eventualities conveyed by sentences marked by the future tense in general are unknown to the speaker (Jesperson 1924; Lyons 1977; Smith 1991), and are likely to be associated with modality (Enç 1996). In this paper, I will show that the Rukai future is a tense marker, which conveys an intrinsic temporal relation of posteriority that involves a given reference time (Reichenbach 1947). In subordinate or embedded constructions, as the reference time may or may not be anchored to the speech time, the future behaves like a relative tense (Comrie 1985; Enç 1987). Furthermore, I will present data to illustrate that the future tense co-occurs with morphologically realized modals, such as the necessity and possibility modals, which specify finer distinctions on modality in sentences whereas the future establishes a temporal relation. This study argues for a compositional analysis of the morphosemantic interaction between the future tense and modals, and that Rukai provides empirical evidence for a division between future and modality in the domain of morphosyntax.

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This paper is organized as follows: Section 2 gives an overview of the grammatical behaviors of the future marker; section 3 discusses the temporal interpretation of the future tense in various constructions; section 4 investigates the relation of the future and modality, and section 5 summarizes the findings of the study.

2. The basics

Rukai has a two-way temporal marking system of nonfuture and future (Zeitoun et al. 1996). Among the languages that have been described as having a nonfuture/future system, such as Dyirbal (Dixon 1972), Hua (Haiman 1980), Gungbe (Aboh 2004), and Tuwuli (Harley 2008), Rukai is one in which both nonfuture and future tenses are morphologically marked (Chen 2008). Sentences marked by the nonfuture tense describe events or states that take place at an indeterminate time between the past and the present, while sentences marked by the future describe eventualities located at a future time (Comrie 1985). In Rukai, while the two tenses are parallel in locating eventualities in complementary time frames to be interpreted, their grammatical differences emerge when examined in the structure. The next subsection addresses some of the morphosyntactic and semantic issues.

2.1. Morphosyntax of tense and related semantic issues

The nonfuture tense is marked by various morphemes, *wa-*, *ma-*, *a-*, *-a-*, the zero morpheme (Ø), and other morpho-phonologically conditioned variants, whose realization depends on verb forms and can bear on situation types, (1a).[2] In contrast, the future tense is marked by the prefixal *lri-* (or its allomorph *i-*), as in (1b). Unlike the nonfuture, the realization of the future does not bear on situation type and is uniformly marked by *(lr)i-* (cf. Li 1973; Zeitoun et al. 1996). On the other hand, a clause with a predicate in its bare form generally does not form an independent sentence, (1c). The nonfuture and the future do not co-occur in the same clause, thus ruling out examples like (2a-b).

(1) a. Wa-thingal-aku iniane.
NF-know-1S.NOM 3S.OBL[3]
'I knew/know him.'

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[2] The realization of the nonfuture tense in different forms can be characterized as a type of morphological selection that reflects properties of the verbs, such as (in)transitivity and stativity. See Chen (2008) for discussion, and Li (1973) for an analysis of tense marking in Tanan Rukai.

[3] The abbreviations used in this paper are: 1/2/3, person; ACC, accusative; COMP, complementizer; DEM, demonstrative; DET, determiner; DUR, durative; FUT, future; GEN/G, genitive; IMP, imperative; INTER, interrogative; MOD, modal; NEC, necessity; NEG, negative; NF, nonfuture; NOM/N, nominative; NOMZ, nominalizer; OBL, oblique; PASS, passive; PFT, perfect; PFV, perfective; P/PL, plural; POSS, possibility; PROG, progressive; REFLX, reflexive; RED, reduplication; S, singular; VERBZ, verbalizer.

b. Lri-thingal-aku iniane.
FUT-know-1S.NOM 3S.OBL
'I will know him.'
c. *Thingal-aku iniane.
know-1S.NOM 3S.OBL

(2) a. *Wa-lri-thingal-aku iniane.
NFUT-FUT-know-1S.NOM 3S.OBL
b. *Lri-wa-thingal-aku iniane.
FUT-NFUT-know-1S.NOM 3S.OBL

On the other hand, the two tenses can occur on different verbs in complex sentences, as the following sentences with embedded clauses in (3) exemplify.

(3) a. Ki-a-pauteng-aku musuane ka lri-kela-su.
believe-NFUT-believe-1S.NOM 2S.OBL COMP FUT-come-2S.NOM
'I believe that you will come.'
b. Ki-a-pauteng-aku lri-tara-ngi-sasirapale ka lasu.
believe-NFUT-believe-1S.NOM FUT-NEC.MOD-REFLX-care NOM guy
'I believe he will take care of himself.'

In biclausal constructions, either the nonfuture or future can be marked on the matrix verbs, but only the future can be marked on the embedded verbs, as shown in (4).

(4) a. Ø-palraingi drangalru ki daane ka Muni.
NFUT-promise watch DET house NOM Muni
'Muni promised to watch the house.'
b. Ø-palraingi lri-drangalru ki daane ka Muni.
NFUT-promise FUT-watch DET house NOM Muni
'Muni promised that she would watch the house.'
c. Lri-palraingi drangalru ki daane ka Muni.
FUT-promise watch DET house NOM Muni
'Muni will promise to watch the house.'
d. Lri-palraingi lri-drangalru ki daane ka Muni.
FUT-promise FUT-watch DET house NOM Muni
'Muni will promise (sometime) to watch the house (at an even later time).'
e. {Lri/Ø}-palraingi (*wa)-drangalru ki daane ka Muni.
{FUT/NFUT}-promise NFUT-watch DET house NOM Muni

Structurally, the future tense differs from the nonfuture in at least two respects. First, the future is more flexible in its position relative to the negative morpheme. The nonfuture can only be marked on verbs, and is thus lower than the negative morpheme in the structure, (5a-b). There are two places where the future can occur – on the verb, as in (5c), or before the negative morpheme, as in (5d). In Rukai, bound pronouns are suffixal, and as examples in (5) show, bound pronouns are attached to the negative morpheme, which is in turn not included in the predicate.

(5) a. Kai-naku wa-thingale iniane.
NEG-1S.NOM NFUT-know 3S.OBL
'I did/do not know him.'

b. *Wa-kai-naku thingale iniane.
NFUT-NEG-1S.NOM know 3S.OBL
c. Kai-naku lri-thingale iniane.
NEG-1S.NOM FUT-know 3S.OBL
'I will not know him.'
d. Lri-kai-naku thingale iniane.
FUT-NEG-1S.NOM know 3S.OBL
'I will not know him.'

That the future occupies a high syntactic position in the structure can be seen in sentences where the future co-occurs with modals. It has been observed that the future *lri-* must precede some modal morphemes, such as the necessity modal *tara-* and the possibility modal *maka-*, as indicated in (6) and (7). It thus follows that in Rukai the interplay between modals and tense can be compositionally analyzed, unlike a language like English in which the modals contribute to temporal interpretation directly, as argued in Condoravdi (2002). See section 4 for a discussion of the interaction.

(6) a. Lri-tara-thethengete musuane.
FUT-NEC.MOD-interfere/coerce 2S.OBL
'I will/must coerce you (regarding your decision).'
b. Lri-maka-thethengete musuane.
FUT-POSS.MOD-interfere/coerce 2S.OBL
'I may/might coerce you (regarding your decision).'

(7) *{Tara/maka}-lri-thethengete musuane.
{NEC.MOD/POSS.MOD}-FUT-interfere/coerce 2S.OBL

When the negative *kai* interacts with the future and modals such as *tara-* and *maka-*, the future can structurally precede or follow the negative morpheme, (8a-b). In either case, the modals must follow the future. On the other hand, the occurrences of modals in (8) and (9) show that modals can either precede or follow negation.

(8) a. Kai-naku lri-maka-thethengete musuane lu lri-mu-inu-su.
NEG-1S.NOM FUT-POSS.MOD-interfere 2S.OBL COMP FUT-go-where-2S.NOM
b. Lri-kai-naku maka-thethengete musuane lu lri-mu-inu-su.
FUT-NEG-1S.NOM POSS.MOD-interfere 2S.OBL COMP FUT-go-where-2S.NOM
'I might not coerce you as to where you will go.'

(9) Lri-tara-kai mu Kucapungan ka lasu.
FUT-NEC.MOD-NEG go (a Rukai village) NOM guy
'The guy will not go to Kucapungan.'

The examples above indicate that (i) the future occupies a higher position above modals, while exhibiting a flexible order relative to negation, and (ii) modals are placed before or after the negative. The schema of the surface structure can be set out in two versions as in (10).

(10) a. [$_{\text{NegP}}$ NEG [$_{\text{TP}}$ FUT [$_{\text{ModP}}$ MOD [...]]]]
b. [$_{\text{TP}}$ FUT [$_{\text{ModP}}$ MOD [$_{\text{NegP}}$ NEG [...]]]]

Rukai exhibits restrictions and variation in the position of sentential negation. The negative morpheme always precedes the predicates and attracts bound pronouns, which indicates that sentential negation blocks verb-movement and has its own projection in Rukai.[4]

On the other hand, altering the positions of the future and negation results in a change of meaning. Consider the examples in (11), repeated from (5).

(11) a. Kai-naku lri-thingale iniane.
NEG-1S.NOM FUT-know 3S.OBL
'I will not know him.'
b. Lri-kai-naku thingale iniane.
FUT-NEG-1S.NOM know 3S.OBL
'I will not know him.'

According to one of the consultants, although (11a) and (11b) are very similar, they have a subtle difference in terms of what is in focus: (a) has the focus on negation, which can be used in the context where the speaker will not or has no desire to know someone; and (b) has the focus on the future, with which a speaker predicts or makes a statement about the future that knowing someone will not happen. The semantic difference caused by positional changes indicates that the future and negation have effects on each other on scope.

2.2. Future and aspect

We have seen that structurally the future tense occupies a position which must be higher than modals, but can be higher or lower than negation. This subsection shows how the future tense interacts with aspect. Data presented in this subsection will be used later to support the claim made in section 3.4 that the future is not an aspectual marker.

The future tense can be marked in sentences of various types of situation, as defined in Smith (1991) (cf. Vendler 1957). Its use is not restricted in terms of situation type and can be marked on predicates of sentences that denote a state, activity, accomplishment, achievement or semelfactive, as shown in (12).

(12) a. Lri-thingal-aku musuane. (state)
FUT-know-1S.NOM 2S.OBL
'I will know you.'
b. Lri-tamaku kai agi-li. (activity)
FUT-smoke DEM brother-1S.GEN
'My brother will smoke.'
c. Lri-pacas ka hung kudra Baleng. (accomplishment)
FUT-write DET.INDEF book DEM Baleng
'Baleng will write a book.'

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[4] Also, the fact that the negative morpheme is situated between the future tense and the verbs, or higher than the entire TP, makes Rukai a language that displays both 'IP-internal' and 'IP-external' properties, if considered in the light of the NegP hypothesis of Ouhalla (1990). I thank one of the reviewers for bringing this reference to my attention.

d. Lri-daruru-ku Vedai. (achievement)
FUT-arrive-1S.NOM Budai
'I will arrive at Budai.'
e. Lri-parulu kudra lasu. (semelfactive)
FUT-cough DEM guy
'That guy will cough.'

On the other hand, the future co-occurs with aspectual markers, such as the progressive, which is realized by verbal reduplication (13a), and the perfective *-nga* (13b).

(13) a. Lri-kanekan(e)-aku kai kange.
FUT-eat/PROG-1S.NOM DEM fish
'I will be eating this fish.'
b. Lri-kane-nga-ku kai kange.
FUT-eat-PFV-1S.NOM DEM fish
'(Until then) I will have eaten this fish.'

3. Temporal interpretation of the future marker

This section investigates the temporal interpretation of the future marker in Rukai. Examples will illustrate clearly that the Rukai future conveys a temporal relation of subsequence involving a given reference time (Reichenbach 1947). As the reference time may or may not be anchored to the speech time (Smith 1997), the future behaves like a relative tense (Comrie 1985; Enç 1987).

In the instances with future marking as discussed in the foregoing section, the situations conveyed by the sentences are all evaluated against a time located in the future when uttered at the speech time. The future tense imposes a temporal restriction on the simple sentences that the conveyed eventualities can be modified by adverbials that signify a future time but not a past time (14a-b).

(14) Lri-katuas-ako {lu asane/lu iya/lu icaili}.
FUT-leave-1S.NOM in a bit/tomorrow/the next year
'I will leave {in a bit/tomorrow/next year}.'

(15) #Lri-udalre {ku asane/ku iya/ku icaili}.
FUT-rain just now/yesterday/the last year
'lit. It would rain {just now/yesterday/last year}.'

On the other hand, the nonfuture is incompatible with temporal modifiers which express a future time, even when it co-occurres with the progressive aspect. Contrast (16a-b).

(16) a. Lri-katuas-ako lu makamolringedele.
FUT-leave-1S.NOM DET.FUT noon
'I will leave at noon (which is a time in the future of now).'
b. #Ma-tuatuas-ako lu makamolringedele.
NFUT-leave/PROG-1S.NOM DET.FUT noon

3.1 Future evaluated in the context of discourse

As we have seen, sentences that convey future eventualities are marked by the future tense. The meaning of the future tense and its use in discourse can be illustrated by the text as shown in (17).

(17) a. Lu iya, lri-i-kai kudra lasu kudra lri-mu-daane kuini
tomorrow FUT-be-DEM DEM guy DEM FUT-go-house DEM
ki tasiubaibaidhane
DET shop
'Tomorrow a guy will enter the shop.
b. La lri-si-laimai kudra salusese ku laimai, lai lri-tamaku.
then FUT-wear-clothes DEM blue DET clothes then FUT-smoke
'He will wear a blue shirt, and will smoke.'
c. Kui Takanau lai lri-kauriva kuini ki lasu.
DEM Takanau then FUT-speak DEM DET guy
'Takanau will then speak to this guy.'

In (17), the five eventualities, the existential sentence's introducing a guy, this guy's entering the shop, his wearing a blue shirt, his smoking, and Takanau's speaking to this guy – one state and four events – are presented in the way that they take place according to the chronological order. All these eventualities take place in the future, and the future tense marking reflects the grammatical requirement (Kamp/Rohrer 1983).

The remainder of this section gives a general outline of the Rukai future tense by examining its use in complex constructions (section 3.2) and on nominals (section 3.3).

3.2. Future in complex constructions

When the future tense is marked in a sentence that follows another as a consequent clause, the future can take the event time of the antecedent clause or the speech time as its temporal reference. The effect of this is that the time of the eventuality conveyed by the future marked clause occurs in the future from now, (18a), or in the future of a past time, (18b).

(18) Wa-kela-ku Vudai, la lri-siuli-ako.
NFUT-come-1S.NOM Budai COMP FUT-return-1S.NOM
a. 'I came to Budai, and I will return.'
b. 'I came to Budai, and I would return.'

By assuming the notion of reference time of Reichenbach (1947), the temporal relation expressed in (18a-b) can be schematized as in (19a-b) respectively (ET, event/situation time; RT, reference time; SpT, speech/utterance time; =, is equivalent to; <, successive order). The anchoring of the reference time of the future marked clause to either the speech time or to a past time gives rise to the semantic difference between (18a) and (18b).

(19) a. ET1=RT1 < SpT < RT2=ET2
b. ET1=RT1 < RT2=ET2 < SpT

In examples where the future can be interpreted in a way like (18b), i.e., (19b), the future behaves like a relative tense.

3.2.1. Subordinate constructions

That the future *lri-* expresses temporal subsequence and at the same time behaves like a relative tense are evident in subordinate clauses, such as those formed by *sa* 'when'. When in *sa*-clauses, the interpretation of futurity is maintained, but the situations that it describes can take place in the past, thus forming future-in-past. Consider the discourse in (20):

(20) a. Wa-kela Taihoko sa kela-nga ki supate ki vai.
NFUT-come Taipei when come-PFV DET four DET hour
b. Sa ka mialrealre, ma-tuase-nga.
when DET morning NFUT-leave-PFV
c. [Sa lri-katuas], maka-si-a-laimai-nga.
when FUT-leave POSS.MOD-wear-NFUT-clothes-PFV
'He got to Taipei at 4 o'clock. He left in the morning. Before he left, he was able to put on his clothes.'

The example contains a series of past eventualities, and we are interested in (20c). In (20c), the embedded verb marked by the future conveys an event of leaving, which is subsequent to the clothes-wearing event expressed by the main clause. The effect of the future marking on the embedded verb is that the conveyed event takes the situation time of the main clause as its reference time; while the future imposes temporal posteriority, it anchors the time when the person left in the future of the time when he put on his clothes. This once again demonstrates the use of the Rukai future marker as a relative tense.

By contrast, if the *sa*-clause has a bare-formed predicate, as in (21), the temporal sequence is reversed that the telic event of leaving occurs before clothes-wearing.

(21) c'. [Sa katuas], maka-si-a-laimai-nga.
when leave MOD-wear-NFUT-clothes-PFV
'After he left, he was able to put on his clothes.'

As the English translations of (20) and (21) indicate, *sa* as a temporal connective does not specify a temporal precedence or succession for the clause it heads. The temporal meaning of the embedded clause is conditioned by overt temporal marking, such as the future *lri-*, as well as semantic features of situation types.[5]

3.2.2. Reported speech

Reported speech is another type of construction where the future tense is used to indicate temporal succession. Consider (22).

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[5] Specifically, the features are [Static], [Durative] and [Telic] (Smith, 1997).

(22) Sa makadulrulru a-miya kai ka Takanau [lri-katuase lu iya
when three/RED NFUT-say DEM NOM Takanau FUT-leave tomorrow
ka Muni].
NOM Muni
'Takanau said three days ago that Muni would leave the next day.' (lit. 'Takanau said three days ago that Muni would leave tomorrow.')

The time of the future-marked embedded clause is interpreted against the time provided by the main clause of saying, with the latter serving as the temporal reference. In (22), while the temporal adverbial *sa makadulrulru* 'when (it was) three days ago' specifies that Takanau made a report three days earlier than the speech time, the future-marked *katuas* 'leave' expresses an event which might take place in the future of Takanau's reporting. Whether Muni left or not is not asserted; the sentence is compatible with further elaboration which asserts that either Muni did leave, or she actually didn't. Also note that whereas the word for *tomorrow* in Rukai (i.e., *lu iya*) can be used in a future-in-past context, the English counterpart does not allow such a use.

3.3. Future marking on nominals

In addition to verbal (and adjectival) predicates, the future *lri-* can be marked on nominals, in which case the marked nominals denote a property predicated of an agent or theme which is obtained at a future time, (23). In contrast, the nonfuture does not occur on predicate nominals.

(23) Ma-thariri turamuru [kudra lri-ka-taelrelreli kudra Asiane].
NFUT-beautiful very DEM FUT-DET-wife DEM Asiane
'Asiane, my future wife, is very beautiful.'

On the other hand, if the same nominal is zero-marked or marked by the perfect aspectual marker *na-*, as shown in (a) and (b) respectively in (24), the denoted property is then associated with a present or a past time, which results in differential readings whether the relevant property – Asiane being the speaker's wife – is obtained at the speech time or not (Chen 2007).

(24) a. Ma-thariri turamuru [kudra taelrelreli kudra Asiane].
NFUT-beautiful very DEM wife DEM Asiane
'Asiane, my wife, was/is very beautiful.'
b. Ma-thariri turamuru [kudra na-taelrelreli kudra Asiane].
NFUT-beautiful very DEM PFT-wife DEM Asiane
'Asiane, my ex-wife, was/is very beautiful.'

3.4. Interim conclusion

Given that the future *lri-* occurs in various constructions, especially on nominals, one might argue that it was not a pure tense but actually something else when generalizing its function. If *lri-* was not a tense, then one could speculate about two hypotheses for its role in Rukai:

(25) a. Hypothesis I: *lri-* is a prospective aspect
b. Hypothesis II: *lri-* is a modal

Let us start with the first hypothesis. Given that *lri-* expresses temporal posteriority and can be marked on (matrix and embedded) verbs and nominals, it seems reasonable to suggest that the future marker is a prospective aspect but not a tense (cf. Guaraní in Tonhauser 2006). This approach does not, however, accord with some theoretical assumptions.

First, as the schema in (10) shows, *lri-* occupies a very high syntactic position in the structure such that it precedes modals, and can precede or follow negation directly. As a theoretical assumption, aspect tends to be closer to the stem of the predicates and is thus usually located in a lower position in the structure.

Secondly, *lri-* co-occurs with aspectual markers, such as the progressive and the perfective markers. Assuming that aspect concerns a temporal relation between reference time and situation time in sentences (Stowell 1996; Zagona 1995; Demirdache/Uribe-Etxebarria 2000, among others), we would need to account for how *lri-* aspectually interacted with another if it was to be taken as a prospective aspect (cf. Nishnaabemwin future (Valentine 2001); Cree (Wolvengrey 2006, and reference therein)).

The fact that the future *lri-* occupies a high position lends to the second hypothesis that it might be a modal. I have assumed in the previous discussion that the future *lri-*, as well as its allomorph *i-*, is a tense, and in the following section I will overrule hypothesis II and assert that, provided that it precedes modals and that the combination of modality and temporality can be compositionally analyzed, the future morpheme is a tense.

4. Interaction between the future and modals

This essay's analysis shows that the Rukai future marker conveys temporal posteriority with respect to a reference time. This section provides more evidence for a tense analysis that in modal constructions the future tense conveys temporality, while modality, such as necessity and possibility, is specified by modal morphemes. In this approach, Rukai future tense and modals contribute to the meaning of sentences compositionally.

A simple future-marked sentence primarily describes an eventuality that the speaker takes to occur in the future, i.e., a use in the domain of temporality. The future is not specifically used to indicate that the speaker imposes an obligation on the agent of the eventuality, or that he gauges the possibility of its occurrence. However, such information of obligation or possibility is indeed compatible with the future and can be inferred from the sentences if the context allows. This can be seen in instances where the addressee is a second person as in (26):

(26) I-kela-su kai.
FUT-come-2S.NOM DEM
'You {will/should/must} come here.'

In contrast, however, when the utterance is addressed to a participant that is not the agent of the predicate, e.g. (27), the future does not specify modality, and the sentence does not have a definite modal meaning besides a temporal meaning.

(27) Lri-kela kai ka Takanau.
FUT-come DEM NOM Takanau
a. 'Takanau {will/is going to} be here.'
b. ?'Takanau {must/may/might/could} be here.'

To indicate the degree of the speaker's commitment to the truth of a proposition, additional elements, such as the sentential modal *alau* 'probably' in (28), are used to specify the reading.

(28) Alau lri-mu-Kucapungane ka lasu.
probably FUT-go-Kucapungan NOM guy
'The guy will probably go to Kucapungan.'

Two members in the category of modality of Rukai – *tara-* and *maka-* – share grammatical properties and are treated under a uniform analysis with respect to their interaction with the future marker. We have seen in section 2.1 that *tara-* and *maka-* only follow the future, but occur either under or above the negative, as has been shown in (10). While the structural similarity indicates that they are elements of the same grammatical category, the distinction between these two modals can be characterized as one between necessity and possibility, (29).

(29) NEC.MOD: *tara-* 'must; can; will' (epistemic/deontic/dynamic)
POSS.MOD: *maka-* 'may; can; could' (epistemic/dynamic)

Tara- has a wider range of use in being able to convey epistemic, deontic or dynamic modality (Bybee et al. 1994; Palmer 2001), and can be compared to English *must*, *can* or *will*. In contrast, *maka-* has only been observed to convey epistemic or dynamic modality, with which use it can be compared to English *may*, *can*, or *could*. In the following subsections, I examine modal sentences and show that the future tense and modals can contribute to the meaning of sentences independently.

4.1. Future and the necessity modal *tara-*

One way of interpreting the future tense in sentences usually concerns the reading of epistemic modality, and more specifically, the reading of inferred certainty. We start with the necessity modal *tara-*.

In simple affirmative sentences, *tara-* is used to describe a proposition which, based on avail- able information or (in)direct experience, a speaker thinks needs to be true at the speech time. This is exemplified by (30). In this use, the speaker is fully committed to the truth of the proposition.

(30) Kai tarudraudrange tara-i-a-kai ku vaeva ku abulu; maru
DEM elder NEC.MOD-be-NFUT-DEM DET one DET story like
a-mani-nga kudra senai ki tarudraudrange kai abulu.
NFUT-be-EMPH DEM song GEN old DEM story
'An elder must/got to have a story to tell; the story would be just like an old song.' (epistemic)

(31) further illustrates the semantic effect of *tara-*. In contrast to the simple nonfuture in (31a), the existential predicate *i-* 'be' marked by *tara-* in (31b) indicates that the speaker of this utterance commits himself to the truth of Takanau's being there:

(31) a. I-a-kai ka Takanau.
be-NFUT-DEM NOM Takanau
'Takanau is there.'
b. Tara-i-a-kai ka Takanau.
NEC.MOD-be-NFUT-DEM NOM Takanau
'Takanau must be there.' (epistemic)

In quantificational constructions, *tara-* conveys dynamic modality. As exemplified in (32), under the scope of *sana-* 'every', *tara-* involves an interpretation that involves the speaker's attitude towards the subject or the agent's (a Rukai man's) ability to hunt, a necessary property that is internal to the agent (Bybee et al. 1994; Palmer 2001).

(32) Sana ka sauvalai ki Ngudradrekai tara-alupu.
every DET man DET Rukai NEC.MOD-hunt
'Every Rukai man can/is able to hunt.' (dynamic)

Tara- appears in an utterance where the speaker imposes an obligation on the agent of the conveyed eventuality. In the conditional construction of (33), the speaker requests that in case of adversity the addressee inform the speaker.

(33) Alaiyasi i-kai ku ta-ngituman-ane-su, tara-pelaela nakuane
if be-DEM DET NFUT-INTER-NOMZ-2S.GEN NEC.MOD-tell 1 S.OBL
kai asasane.
DEM now
'If there is something happening to/bothering you, you must tell me now.' (deontic)

Now let us turn to the interaction between the future and *tara-*. We have seen from (27) that although the future is compatible with some kinds of modality, it is not associated with a particular kind (cf. English *will*, Enç (1996)). In contrast, when the predicate is marked by both the future and *tara-*, the sentence concerns both temporality and modality. Consider (34).

(34) a. Lri-kela kai ka Takanau.
FUT-come DEM NOM Takanau
'Takanau {will/is going to} be here.' (repeated from (27))
b. Lri-tara-kela kai ka Takanau.
FUT-NEC.MOD-come DEM NOM Takanau
'Takanau will certainly be here.'

The two examples show that (i) the simple future in (34a) has a salient temporal reading, which conveys that the speaker makes a prediction about an eventuality that is located in the future, and (ii) that with the future and *tara-* co-occurring as in (34b), it results in a reading that the speaker is certain that Takanau will be here at a future time. Thus, the sentence has both a temporal and a modal meaning.

As a final remark, one use of the future tense that is relevant to the discussion is, speakers use the future to impose an obligation or issue a request when addressing to a second person, as we have seen in (26), repeated here in (35).

(35) Lri-kela-su kai.
FUT-come-2S.NOM DEM
'You {will/should/must} come here.'

The sentence can signify a polite request or entreaty, one that is close to an imperative, and thus conveys a deontic reading. The use of the future in (35) is very similar to what Bybee et al. (1994) have defined for English *can* and *must* in directives (p.178-179) (also Lyons 1977). However, although the future marked sentences can be interpreted as commands or requests, the future is not a canonical imperative marker. Imperative sentences are formed by *-a*, a suffixal morpheme that is attached to the matrix predicate. As exemplified by (36), the sentence is a direct command to a second person, whereas the counterpart marked by the modal *tara-* is used as a request or an entreaty. Note that the future is incompatible with the imperative morpheme, as shown in (37).

(36) a. Kela-a kai!
come-IMP DEM
'Come here!'
b. Tara-kela-su kai!
NEC.MOD-come-2S.NOM DEM
'You must come here!'

(37) *Lri-kela-a kai!
FUT-come-IMP DEM

4.2. Future and the possibility modal *maka-*

The modal *maka-* is associated with modal meanings of ability and possibility. In affirmative sentences like those in (38), *maka-* frequently conveys a reading that can be translated into English *can* with an interpretation of ability. Specifically, the use of *maka-* is concerned with enabling the agent of the eventualities to act, with the speaker's own evaluation (Palmer 2003).

(38) a. Maka-tu-a-daane ka la-lasu.
POSS.MOD-VERBZ-NFUT-house NOM PL-guy
'The men {can/could/are able to} build a house.'
b. Maka-wa-senai ka ina.
POSS.MOD-NFUT-sing NOM mother
'Mother {can/could/is able to} sing.'

In other examples, *maka-* is used to convey possibility. For example, the sentence in (39a) is marked by *maka-* and is to inquire about the realization or completion of an electing event with respect to the possibility.

(39) Q: Maka-wa-sinkio-nga-numi ki talialalai-numi?
POSS.MOD-NFUT-elect-PFV-2P DET chief-2P
'Is it possible that you have elected your president?'
A: Maka-wa-sinkiokio-nai.
POSS.MOD-NFUT-elect/RED-1P
'We {managed/were able} to elect one.'

In negation, it becomes prominent that *maka-* expresses the speaker's attitude towards the relevant eventuality such that the speaker thinks that it is not possible for the eventuality conveyed in a sentence to take place. Thus, with the marking of *maka-*, the speaker considers it not possible for one to find an answer (40a), to hear a sound (40b), or to find the addressee (40c). Note that this reading is different from *It is possible for. . . to not hold*.

(40) a. Kai-naku maka-ki-a-dingai ku satubalreane.
NEG-1S.NOM POSS.MOD-find-NFUT-find ACC answer
'I couldn't find the answer.'
b. Kai maka-ki-a-lrala ki lingau ka lasu.
NEG POSS.MOD-hear-NFUT-hear OBL sound NOM guy
'He could not hear a sound.'
c. Wa-silap-aku musuane ku iya, la kai-naku
NFUT-look for-1S.NOM 2S.OBL yesterday then NEG-1S.NOM
maka-kidring.
POSS.MOD-find
'I looked for you yesterday, but I could not find you.'

Again, we examine the way the future interacts with *maka-*. Contrast the sentences in (41).

(41) a. Lri-ngi-sasirapal-aku.
FUT-REFLX-take.care-1S.NOM
'I will take care of myself.'
b. Lri-maka-ngi-sasirapal-aku.
FUT-POSS.MOD-REFLX-take.care-1S.NOM
'I {will be able to/may} take care of myself.'

Future-marked sentences like (41b) are interpreted as modal sentences that are interpreted in a future time frame; the possibility about the truth is evaluated against a future temporal reference in the domain of temporality. The combination of future possibility *lri-maka-* is incompatible with temporal expressions that denote a past time reference, as in (42).

(42) *Lri-maka-ngi-sasirapal-aku {ku iya/ku nadruma}.
FUT-POSS.MOD-REFLX-take.care-1S.NOM yesterday/before
'lit. I would/might take care of myself yesterday/before.'

Building on the treatment of English modals by Enç (1996), I take *tara-* to be a necessity modal that involves universal quantification, and *maka-* a possibility modal that involves existential quantification over possible worlds (Kratzer 1981). In examples where the modals co-occur with the future, the modals express information of necessity (*tara-*) and possibility (*maka-*), while the future provides temporal information regarding a future time frame within which the sentences are temporally evaluated.

4.3. A division between future and modality

The future implicates possibilities from a certain perspective, which can be illustrated by the temporal structure of Kamp/Reyle (1993), in which possibilities in a world (*w*) are depicted as lines that branch from the *t* point, a temporal perspective where possibilities ramify. However, when future eventualities are evaluated at a perspective time, the reality or actuality of these eventualities are not specified by the future tense (Kamp/Reyle 1993). For this reason, the future is usually described as a tense that modifies eventualities which are unknown to a speaker (Smith 1997), and is associated with modality.

In the foregoing subsections, we have seen how the future interacts with modals in Rukai. While each of the modals can designate different kinds of modality, the future is always associated with temporality. If *lri-* was to be treated as a modal, then an immediate consequence would be that we were dealing with sentences with multiple modals. In the light of the meaning of futurity, such an approach would still have to account for the source of temporal interpretation. The investigation of the interplay between the future and modals indicates that *lri-* is a tense morpheme, and Rukai provides multiple examples where we see a division between future and modality at morphosyntactic and morphosemantic levels.

5. Conclusion

Through its interaction and co-occurrence with different grammatical elements like negation, aspectual markers and modals, I have argued that in a future/nonfuture system the Rukai future is a tense morpheme that bears a consistent association with temporal posteriority in various sorts of sentences. The specification of modality with various modal morphemes in future sentences demonstrates that the future tense does not specify a concrete modal meaning. The division between future and modality in Rukai supports a compositional analysis of these two categories.

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Julia Landgraf

Tense in the Scottish Gaelic Verbal System

1. Introduction

Different from most other languages, Scottish Gaelic (ScG) lacks a simple present tense (exception: copula/auxiliary). Instead, two other tenses are used to express present time reference: a present progressive which, in fact, can only be employed in a proper progressive sense (*Tha Murchadh a' leughadh an leabhair.* 'Murchadh is reading the book'[1]), and a future tense, which interestingly is also being used with a (mostly habitual or historic) present time reference.

Thus, whereas we are frequently confronted with examples such as *Murchadh drives to Inverness tomorrow* conveying a future meaning through the present tense in e.g. English, French and German, the opposite is encountered in Scottish Gaelic: On the one hand there are examples such as *Bidh Murchadh a' draibheadh a dh'Inbhir Nis a-màireach* ('Murchadh will be driving to Inverness tomorrow') where a future progressive time reference is, in fact, expressed by a future progressive construction; but on the other hand the same sentence *Bidh Murchadh a' draibheadh a dh'Inbhir Nis* will be found meaning 'Murchadh drives to Inverness', implying that he drives there on a regular basis, thus with a present time reference. There is no other way to express a simple present in Scottish Gaelic, but through future constructions (simple future and future progressive, but not through the equivalent of the *going to*-future: *Tha mi a' dol a dhèanamh X.* 'I am going to do X').

In general it seems to be the case that the marking of tense is not very prominent in Scottish Gaelic. There are other categories, e.g. types of mode (independent/dependent/relative forms), to which the marking of tense might be subsidiary. To figure out whether or not this is the case, and how those different categories are organised within their functions, will be the main question of this paper.

Scottish Gaelic is a VSO language. As for its inflectional system, it distinguishes between a 1st, 2nd, and 3rd person in singular and plural. There used to be a dual as well, however this is only a marginal phenomenon in modern Scottish Gaelic.

In ScG we mainly encounter periphrastic forms, and number and person are not marked on the verb but exclusively expressed by the subject. The only exceptions are to be found in 1st person singular and plural forms of the conditional and in imperative forms.

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[1] Due to the influence of English, some people have started using the ScG present progressive in spoken language in cases where originally only a future progressive would be licensed. However, this minor development is not important for the structure and argument of this paper. – Unless marked otherwise, all examples have been created by myself (non-native speaker of Gaelic) an approved by native Gaelic speakers.

(1) a. Tha mi ag[2] èisteachd.
be.Pres I at listen-Vn[3]
'I am listening.'
b. Tha thu/e/i/sinn/sibh/iad ag èisteachd.
be.Pres you/he/she/we/you.Pl/they at listen-Vn
'You/he/she/we/you/they is/are listening.'

(2) a. Dh'èist mi.
listen.Past I
'I listened.'
b. Dh'èist thu/e/i/sinn/sibh/iad.
listen.Past you/he/she/we/you.Pl/they
'You/he/she/we/you/they listened.'

This paper will focus on the structure and interpretation of tense in Scottish Gaelic, and it will be structured as follows: The first part will give an overview of the main differentiations in tense, their morphology and interpretation (2.1) before considering aspect in Gaelic (2.2).

The next part (3.1) will be dealing with particular verb forms, examining the three main verb categories in Scottish Gaelic: the independent, dependent and relative form. It is striking that in most cases the verb itself is not morphologically marked for tense, but rather according to the distinction of dependent, independent or relative forms (categories of mode) in the first place. It is these forms along with the syntactic context (particles etc.) in which the verb is found that, in fact, indicate the tense it conveys. Adaptation problems in the notation and questions on the hierarchy of how to mark verb forms will be dealt with in (3.2).

In the discussion (part 4) the question will be introduced whether the independent/dependent-distinction is more prominent in Scottish Gaelic than the formal distinction of tenses, and whether it is partially due to this type of hierarchy that a verbal system has been triggered that includes multifunctional tense expressions.

2. Forms of Tense and Aspect

At this stage it will be necessary to take a look at principal classifications of tense in Scottish Gaelic and how the language makes use of these in order to maintain its ability of expressing any possible circumstances and situations accurately in accordance with the assumed time dimensions (2.1).

In order to include all possible constructions that combine different tenses with different aspects of described actions, a quick look will be taken at the possible categories of simple and compound aspect in Scottish Gaelic (2.2).

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[2] Originated from the full preposition *aig* 'at'; in verbal noun constructions either *ag* (with vowel-initial verbs) or *a'* (with consonant-initial verbs) are used.

[3] VN = verbal noun; in its meaning similar but not identical to progressive forms *(-ing)* in English.

2.1. Main Categories of Tense

The principal differentiation of tense in Gaelic is of the form Past vs. Future (or as proposed by MacAulay 1996: Past vs. Non-Past.). There used to be separate forms for present and future tense in Old and Middle Irish, however, presumably for economic reasons they were not maintained in modern Scottish Gaelic, since they would have been redundant in its functioning tense system. Instead, a functional distribution of tense is encountered: on the one side there is the past tense, expressing everything that, in fact, happened in the past (past time reference), and on the other side the future tense, which conveys a future time reference, but is also able to express historic or habitual present time references (cf. Calder 1972).

There is no simple present in Scottish Gaelic, except for the copula/auxiliary. Forms of the present progressive are used for everything that is happening/continuing to happen in the instant the speaker utters something (e.g. (3)), thus where utterance time overlaps with the time of the event denoted by the verb.[4] Other present time references are expressed using the future tense. It usually depends on the context whether the hearer interprets the verb with a future time reference or with a habitual/historic present reference, e.g. when the utterance contains an adverbial such as "every week" the hearer will know to interpret the verb as conveying a habitual present, whereas with an adverbial such as "tomorrow"/"next week" etc. a future time reference would be established.

The only verb that has separate forms for the present tense is *bith* 'to be' with *tha* (be.PRES) and *bidh* (be.FUT), and therefore it is no problem to build up a present progressive (3) as well as a future progressive (4) with these forms. At the same time, *bidh* is still able to convey a historic or habitual present reading (5):

(3) PRESENT PROGRESSIVE
Tha Iain a' leughadh.
be.PRES Iain at read-VN
'Iain is reading.'

(4) FUTURE PROGRESSIVE
Bidh Iain a' leughadh a-màireach.
be.FUT Iain at read-VN tomorrow
'Iain will be reading tomorrow.'

(5) HABITUAL PRESENT
Bidh Iain a' leughadh a h-uile seachdain.
be.FUT Iain at read-VN every week
'Iain reads every week.'

Examples (4) and (5) show the context dependency of tense interpretation in Scottish Gaelic: The sentence *Bidh Iain a' leughadh* on its own could convey a future time reading or a habitual present reading, depending on the context. Since the respective adverbials in

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[4] There are some cases in which even the future tense can have such a real present interpretation, too; see (11b).

(4) and (5) clearly indicate the desired temporal context, it is immediately understood that (4) expresses future time reference while (5) conveys a habitual present reading.

Synthetic forms of the future tense function in the same way, although it has to be noted that it is a lot more common to use periphrastic forms of the future tense when expressing a habitual/historic present reading than synthetic forms.

(6) FUTURE or HISTORIC/HABITUAL PRESENT
Coisichidh mi. (→ regular future tense (IND[5]): root + *-(a)idh*)
walk-FUT I
'I will walk.' / 'I walk.'

(7) FUTURE or HISTORIC/HABITUAL PRESENT
Cha choisich mi. (→ regular negation (future) (DEP): *cha* + root *(lenited)*)
NEG walk-FUT I
'I will not walk.'/ ' I don't walk.'

(8) FUTURE or HISTORIC/HABITUAL PRESENT
Cò choisicheas? (→ regular s-future/relative form (REL): root + *-(e)as*)
Who walk-s-FUT
'Who will walk?' / 'Who walks?'

Depending on the context and possible adverbials, examples (6) to (8) could all be interpreted with a future or a present time reference.

Generally, it is very common to find multifunctional forms in the Scottish Gaelic verbal system. In most cases, the verb itself is not morphologically marked for tense, it is rather the case that the intended time reading is determined through syntactic context and particles. This will be discussed in detail in part 3 of this paper.

2.2. Aspect

There are three main categories of aspect in Scottish Gaelic (cf. Lamb 2003: 59/60): progressive, perfect and prospective aspect. Progressive aspect signifies a continuing, dynamic process (9a), whereas perfect aspect refers to a state in the present (utterance time = topic time) or in the past (topic time < utterance time) that results from an earlier activity as denoted by the verb (9b).[6] Prospective aspect indicates that something is about to occur

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[5] Examples (6) to (8) also display examples for the aforementioned verbal categories of independent (IND, e.g. (6)), dependent (DEP, e.g. (7)) and relative form (REL, e.g. (8)), which is also called "s-future", due to its regular suffixation with *–(e)as*. The given categories will be further explained in part 3 of this paper.

[6] If the copula was in the past tense (*Bha iad air a' chlach a thogail* 'They had lifted the rock') perfect aspect would thus refer to a state sometime before the utterance time (= past) that resulted from the action denoted by the verb. To put it more formally, perfect aspect either refers to a state within the utterance time, resulting from the completion of an earlier activity (present perfect aspect) or it refers to a state before the utterance time, resulting from the completion of an earlier activity (past perfect aspect). A perfect aspect could also be generated in the future (utterance time < topic time), e.g. where assumptions are expressed: *Nuair a ruigeas mi an taigh a-nochd, tha mi*

(9c). How the respective types of aspect are expressed in Scottish Gaelic is shown in the following examples (examples (9) – (11) taken from Lamb 2003):

(9) a. PROGRESSIVE ASPECT
Tha iad a' togail na cloiche
be.PRES they at lift-VN ART rock.GEN
'They are lifting the rock.'
b. PERFECT ASPECT
Tha iad air[7] a' chlach a thogail
be.PRES they on ART rock.NOM lift-INF
'They have lifted the rock.'
c. PROSPECTIVE ASPECT
Tha iad gus a' chlach a thogail.
be.PRES they till ART rock.NOM lift-INF
'They are about to lift the rock.'

Literally, the progressive aspect expresses a dynamic process which is not accomplished yet at the time of utterance; someone literally is "at" the doing of something, thus in the procedure itself, while the (b) version – perfect aspect – refers to a situation or a state which resulted from the accomplishment of a previous action (while the whole action is still being viewed as a process), and therefore the actual utterance time is either within the topic time (= present perfect aspect) or after the topic time (=past perfect aspect). One of the two prepositions used to form perfect aspect already implies that the former action is really finished with (*an dèidh* 'after'); someone is 'after' doing something, therefore, the activity/process itself must have been accomplished.

The different types of aspect are commonly combined to form different kinds of compound aspect. There are compounds of perfect and progressive aspect (10a), perfect and prospective aspect (10b), as well as prospective and progressive aspect (10c).

(10) a. PERFECT + PROGRESSIVE
Tha iad air a bhith a' togail na cloiche.
be.PRES they on be.INF at lift-VN ART rock.GEN
'They have been lifting the rock.'
b. PERFECT + PROGRESSIVE
Tha iad air a bhith gus a' chlach a thogail.
be.PRES they on be.INF till ART rock.NOM lift-INF
'They have been about to lift the rock.'
c. PROSPECTIVE + PROGRESSIVE
Tha iad gu bhith a' togail na cloiche.
be.PRES they till be.INF at lift-VN ART rock.GEN
'They are about to be lifting the rock.'

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an dùil gum bi iad dìreach air a' chlach a thogail 'By the time I will arrive at the house tonight, I expect that they will just have lifted the rock.'

[7] Depending on the dialect; also *an dèidh* 'after' instead of *air* 'on'. Both aspectual particles/prepositions convey the same aspect in this construction and their choice is based on dialectal habits and preferences only. The fact that the original prepositions' meanings are very different ('on' vs. 'after') does not make a difference to the meaning of their grammatical function today within the perfect forms.

There is an interesting point coming up in connection to aspectual distinction and synthetic future forms: in some cases, even if a proposition is about something happening in the very instant the speaker makes an utterance – a scenario where the present progressive would be expected – the future tense may take over (the synthetic version).

(11) a. HABITUAL PRESENT
Chì mi an duine sin a h-uile latha.
see.FUT I ART man that every day
'I see that man every day.'
b. IMMEDIATE PRESENT
Chì mi an duine sin a-nis.
see.FUT I ART man that now
'I (can) see that man now.'

At a first glance, such an example (11b) might seem like a clash between the usual expectation of a future reading (or a historic/habitual present reading that would go along with the simple future tense, depending on the adverbial and the context) and the temporal adverbial *a-nis* 'now'. However, this combination is only used to announce something happening that had somehow been expected for a while. In (11b) it seems to be the case that someone had been waiting for a certain man to arrive, and was looking out for him. When he finally appears, his using the phrase *Chì mi an duine sin a-nis* simply conveys something like 'I could not see him before, though I was expecting him, but there he is now'.

The above reading can only be generated through the use of an adverbial that connects the utterance to the immediate present. Otherwise, the rules of interpretation that we have encountered in section 2.1 still hold (see (11a)):

3. Forms of the Verb and their Prominence

In this part of the paper the distinction of the independent, the dependent and the relative form will be introduced and established with the help of examples including copula-constructions, weak and strong verbs (3.1). Moreover, the three categories will be set in relation to one another before we discuss their function and their prominence in the Scottish Gaelic verbal system, as well as the problems that go along with the notation and the related interpretation of those forms and systems (3.2).

3.1 Independent, Dependent and Relative Form

As is common in most languages, verbs in Scottish Gaelic can be divided in two groups: weak verbs vs. strong verbs. Weak verbs operate with the same root in all circumstances, whereas strong verbs make use of different roots.

In Scottish Gaelic there is another distinction of verb categories which is of great importance to the underlying structure of the language itself. It may be looked at as a certain mechanism that makes the languages function; without it, most of the information that is transmitted through verbs could not be deciphered, since the classical verb categories are simply not suitable enough.

The most prominent distinction in Scottish Gaelic is between the independent (IND), the dependent (DEP) and the relative (REL) form of a verb. Those categories are not directly related to issues such as tense. Thus the question arises as to how it is decided which of the three forms is the appropriate one to be used in which context and which issues they are related to.

The choice of independent and dependent forms is dependent on sentence types. Different sentence types in Scottish Gaelic are marked by so called overt sentence class markers (cf. Lamb 2003) which indicate the type of a given sentence, and provide the necessary information as to which form of the verb is requested. Those sentence class markers take the forms of negation, interrogative marking, negative interrogative marking, positive linking forms and negative linking forms[8] (cf. examples (17) - (21)). All of those demand the dependent form of the verb. The dependent form is unable to appear independently in a sentence, it needs certain particles in its environment in order to be licensed.

If there is no overt sentence class marker, the sentence is of a positive type, and the independent form is required, since the verb rules the sentence on its own, without the support of a sentence class marker (cf. (16)). Since the independent form is licensed in itself, it does not require additional particles in its environment.

The relative form is needed to form the so called s-future (named due to its suffixation – *(e)a**s***), a particular form of the future tense that is triggered by certain categories in the immediate syntactic environment, such as relative pronouns, *ma* 'if', and most *wh*-questions (cf. 3.2).[9] The exact conditions that trigger the s-future form a complex subject of their own and will not be discussed in this paper. Generally, the relative form can only be expected where there would be an independent verb form on a different tense level. Therefore, it is problematic to consider it a completely separate category besides the independent and the dependent form in all cases. It rather turns out to be some kind of subcategory of the independent form, although it cannot take all the positions that the independent form can. For example, in a simple positive declarative sentence, the relative form could never stand on its own, one would have to use the independent form of the future.

Thus it seems that there is some sort of 'job sharing' between the independent and the relative form in the future tense: in a plain positive sentence, the only way to fulfil the request for an independent form is to use the actual independent form of the future tense. In e.g. *wh*-questions (except for *càite* 'where'), relative clauses and sentences with *ma* 'if', the relative form has to be used to fulfil that same requirement.

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[8] These forms are complementisers with an integrated notion of negation or non-negation for the embedded sentence.

[9] (A) an duine a g**h**abh**as** cofaidh
the man who take-s-FUT coffee
'the man who will take/takes coffee'

(B) ma c**h**oisich**eas** i
if walk-s-FUT she
'If she will walk/walks'

The following examples present a consonant-initial weak verb, a vowel-initial weak verb and a strong verb in the forms discussed above (cf. Lamb 2003: 56/57).

(12) Example for consonant-initial verb (weak):

Root:		*coisich*	'walk'
Past:	IND:	*c**h**oisich*	'walked'
	DEP:	*(do) c**h**oisich*	'walked'
Future:	IND:	*coisich**idh***	'will walk'
	DEP:	*coisich*	'will walk'
	REL:	*c**h**oisich**eas***	'will walk'

(13) Example for vowel-initial verb (weak):

Root:		*òl*	'drink'
Past:	IND:	*dh'òl*	'drank'
	DEP:	(*do) dh'òl*	'drank'
Future:	IND:	*òlaidh*	'will drink'
	DEP:	*òl*	'will drink'
	REL:	*dh'òlas*	'will drink'

(14) Example for strong verb:

Root:		*rach/theirig*[10]	'go'
Past:	IND:	*chaidh*	'went'
	DEP:	*deach*	'went'
Future:	IND:	*thèid*	'will drink'
	DEP:	*tèid*	'will drink'
	REL:	*thèid*[11]	'will drink'

Since the other possible tenses in Scottish Gaelic are expressed periphrastically, using a form of *bith* 'to be', the above categories plus the respective verbal noun are the most important ones for tense. They are the basic structures that need to be put together to form any other tense (cf. 2.2).

The overt sentence class markers as they have been named are all dominant, i.e. they overrule the verb on its own and require for it to be in the dependent form. The dependent forms of a verb may look slightly different in combination with different occurring forms, and will also give a clear idea of how the different markers work within the tense system.

The positive sentence class marker is non-dominant and non-overt. Therefore, a verb in a positive sentence will function independently, and cannot be overruled. Scottish Gaelic makes use of the following types of sentence class markers:

(15) a. Positive (non-dominant)
b. Negation (dominant)
c. Interrogative Marker (dominant)
d. Negative Interrogative Form (dominant)
e. Negative Linking Form (dominant)

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[10] Both versions of the root are commonly used, depending on dialect, and they do not differ in their meaning.

[11] With strong verbs, there are no separate forms for the independent form in the future tense and the relative form. They do not have an s-future and thus the same form is used as independent and relative in the future.

f. Positive Linking Form (dominant)

In order to show how those sentence class markers function, examples for every category (and for several specific sentence class markers) will be provided in (16)-(21). The same verbs will be used throughout the examples: first, a copula construction (in the present, past and future tense), then a weak verb (*coisich* 'walk' cf. (12) in the future and the past tense) and finally a strong verb (*rach/theirig* 'go' cf. (14) in the future and in the past tense).

(16) Examples for Positive Sentences (required: IND form)
a. COPULA-CONSTRUCTION
Tha/ Bha/ Bidh sinn sgìth.
be.PRES/ be.PAST/ be.FUT we tired
'We are/were/will be tired.'
b. WEAK VERB (root: *coisich* 'walk')
i. Coisichidh mi.
walk-FUT I
'I (will) walk.'
ii. Choisich mi.
walk.PAST I
'I walked.'
c. STRONG VERB (root: *rach /theirig* 'go')
i. Thèid mi dhachaigh.
go.FUT I home
'I (will) go home.'
ii. Chaidh mi dhachaigh.
go.PAST I home
'I went home.'

In (16a-c) the verb stands on its own, without further particles or conjunctions. Since the form of the verb literally is independent, it can maintain the sentence on its own, while being a fully valid form.

(17) Examples for Negation (required: DEP form)
a. COPULA-CONSTRUCTION
Chan eil/ Cha robh/ Cha bhi sinn sgìth.
be-NEG-PRES/ be-NEG-PAST/ be-NEG-FUT we tired
'We aren't/weren't/won't be tired.'
b. WEAK VERB
i. Cha c**h**oisich mi.
NEG walk-FUT I
'I will not/do not walk.'
ii. Cha do[12] choisich mi.
NEG PRT walk.PAST I
'I didn't walk.'

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[12] *Do* = Particle marking the past tense with weak verbs (dependent forms); PRT = particle. *Do* used to appear with the independent form of weak verbs in the past tense as well, but due to lack of accent it has disappeared in modern ScG, leaving its trace in the lenited form of the independent weak verb (Calder 1972). Historically, *do* has been used to denote 'completed action' on a verb (Thurneysen 1946).

c. STRONG VERB

i. Cha tèid mi dhachaigh.
NEG go.FUT I home
'I will not/do not go home.'

ii. Cha deach mi dhachaigh.
NEG go.PAST I home
'I didn't go home.'

The verb forms that are encountered in (17a-c) would not be able to exist independently; whether it is the copula, a weak or a strong verb, they are all connected to a negation particle. Only in combination with this particle do they create a valid verb form (*Cha(n)* + DEP). The choice of *Chan* over *Cha* in some cases (e.g. *Chan eil* rather than **Cha eil*) is due to phonological reasons, thus whenever *Cha* is followed by a vowel-initial verb, an *n* is inserted in order to make the phrase easier to pronounce. In some cases *cha* triggers lenition in the following word, as you can see in (17b) *Cha c**h**oisich mi* instead of **Cha coisich mi.* Again, this is simply due to phonological reasons and does not change the meaning of the verb.

In order to express negation in the past tense (with a weak verb), the particle (PRT) *do* must be inserted. This particle is the only indicator of a past time reference and its presence is therefore essential, since neither the verb itself nor the respective sentence class markers convey time references.

Neither of the above verb forms could stand on their own, nor do they appear as free standing forms in other contexts. They need another particle (in this case negation, in (18) it is the interrogative marker) in order to function properly.[13]

(18) Examples for Interrogative Markers (required: DEP form)

a. COPULA-CONSTRUCTION
A bheil/ An robh/ Am bi sibh sgìth?
INT[14]-PRES/ INT-PAST/ INT-FUT you.PL tired
'Are/Were you tired?/Will you be tired?'

b. WEAK VERB

i. An coisich thu?
INT walk.FUT you.SG
'Will/Do you walk?'

ii. An do choisich thu?
INT PRT walk.PAST you.SG
'Did you walk?'

c. STRONG VERB

i. An tèid thu dhachaigh?
INT go.FUT you.SG home
'Will/Do you go home?'

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[13] It might be worthwhile mentioning that in spoken language the proper forms are often shortened. Therefore it is not uncommon to hear questions such as *Bheil thu a' tighinn?* or even '*Eil thu a' tighinn?* 'Are you coming?' where the full interrogative form *A bheil* has been shortened for convenience of speech. However, this is a phenomenon of spoken language, and it does not mean that a dependent form can appear on its own.
Similarly, the interrogative particle in the past tense *An do* in questions such as *An do rinn thu sin?* 'Did you do that?' is often shortened to *Na.* Again, this does not affect the underlying structure.

[14] INT = Interrogative particle

ii. An deach thu dhachaigh?
INT go.PAST you.PL home
'Did you go home?'

It is not unusual to notice in example (18a) that the forms of *bith* are quite irregular. This is typical for the copula; all the other verbs usually maintain a dependent form that remains the same in all dependent contexts, except for minor phonological adjustments.

In (18a-c) we find an interrogative particle in the same place where the negation particle in (17a-c) was located. The sentence structure is not changed as such, but this time a question is generated instead of a negative assertive sentence.

Examples (19a-c) display the same process for negative questions, using the negative interrogative particle *nach:*

(19) Examples for Negative Interrogative Markers (required: DEP form)
a. COPULA-CONSTRUCTION
Nach eil/ Nach robh/ Nach bi sibh sgìth?
INT-PRES-NEG/INT-PAST-NEG/ INT-FUT-NEG you.PL tired
'Aren't/Weren't you tired?/Won't you be tired?'
b. WEAK VERB
i. Nach coisich thu?
INT.NEG walk.FUT you.SG
'Will you not walk?'
ii. Nach do choisich thu?
INT.NEG PRT walk.PAST you.SG
'Did you not walk?'
c. STRONG VERB
i. Nach tèid thu dhachaigh?
INT.NEG go.FUT you.SG home
'Will/Do you not go home?'
ii. Nach deach thu dhachaigh?
INT.NEG go.PAST you.SG home
'Didn't you go home?'

Negation in embedded sentences is always expressed through the complementiser itself, and it is generated in exactly the same way as negative questions (*nach* + DEP (19)). In this case (e.g. (20)), *nach* does not function as a negative interrogative particle, but as a negative complementiser (COMP.NEG).

It is not possible in Scottish Gaelic to use *gu(n/m)* + DEP as a complementiser and then negate the embedded sentence as such. Negation is always immediately expressed along with the finite verb, and it can never appear separately from the verb. It is always clear from the first constituent of a main clause whether to expect a negative or a positive assertion, and in the same way the complementiser always determines the nature of the following embedded clause in more complex sentence structures.

(20) Examples for Negative Linking Form[15] (required: DEP form)
Tha e ag ràdh...
be.PRES he at say-VN
'He is saying...'
a. COPULA-CONSTRUCTION
... nach eil sibh sgìth
COMP.NEG be.PRES.DEP you.PL tired
'…that you aren't tired.'
b. WEAK VERB
i. ...nach coisich thu.
COMP.NEG walk.FUT you.SG
'…that you won't/don't walk'
ii. …nach do choisich thu.
COMP.NEG PRT walk.PAST you.SG
'…that you didn't walk'
c. STRONG VERB
i. ...nach tèid thu dhachaigh
COMP.NEG go.FUT you.SG home
'…that you won't go home.'
ii. ...nach deach thu dhachaigh.
COMP.NEG go.PAST you.SG home
'…that you didn't go home.'

As far as the sentence structure is concerned, positive linking is expressed similarly to negative linking, i.e. through a complementiser + DEP. The positive complementiser (COMP.POS) is of the form *gu(n/m)* instead of *nach*, but apart from that, the same rules apply. The choice of *gu* vs. *gun* vs. *gum* is based on phonological reasons; for example, *gum* has to be used instead of *gun* when the following verb starts with b, f, m or p.

(21) Examples for Positive Linking Form (required: DEP form)
Tha e ag ràdh...
be.PRES he at say-VN
'He is saying...'
a. COPULA-CONSTRUCTION
... gu bheil/ gun robh/ gum bi sibh sgìth.
COMP.POS-PRES/ COMP.POS-PAST/ COMP.POS-FUT you.PL tired
'…that you are/were/will be tired.'
b. WEAK VERB
i. …gun coisich thu.
COMP.POS walk.FUT you.SG
'…that you will walk.'
ii. …gun do choisich thu.
COMP.POS PRT walk.PAST you.SG
'…that you walked.'

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[15] The actual verb form in negative linking is the same as the negative interrogative marker; however, it functions as a complementiser in the case of negative linking.

c. STRONG VERB

i. …gun tèid thu dhachaigh.
COMP.POS go.FUT you.SG home.
'that you (will) go home.'

ii. …gun deach thu dhachaigh.
COMP.POS go.PAST you.SG home.
'…that you went home.'

3.2. Prominence of Categories and Problems with their Notation

Looking at the long list of examples in 3.1, one can see that the actual form of the verb can be the same in very different contexts and syntactic environments, and yet fulfil a completely different function. Taking a look at example (17b (i) and (ii)) one will notice that the forms of *coisich* are exactly the same (*Cha choisich mi* 'I won't/don't walk' vs. *Cha do choisich mi* 'I didn't walk.'), although one is meant to express a past time reading while the other carries a future/present time meaning.

It is, in fact, problematic to even call the verb forms in (17b) "walk.FUT" and "walk.PAST" in the first place, since it is the constellation triggered by the sentence class marker that identifies the verb as representing future/present time reference or past time reference. The verb itself is not marked for tense in these cases, and therefore it is possible that the same form conveys "walk.PAST" in the one context and "walk.FUT" in the other. That should not lead to the conclusion that forms – whether IND or DEP – are interchangeable in general; this is definitely not the case. However, weak verbs sometimes have very similar forms for the IND and the DEP, and due to their nature of using the same root in all circumstances, their forms on the past vs. non-past scale are naturally not as distinguishable as are the forms of strong verbs.

With strong verbs, there is a clear distinction of past vs. non-past since they operate with different roots. In the above examples with *rach/theirig* 'go' it became very clear that whenever a form of *thèid* is encountered, one is dealing with a future/present or simply a non-past level, whereas *deach* and *chaidh* clearly indicate a past time reference and could never occur in a non-past context.

This leads up to the question of the correct notation of verbs. Since there is this difference between weak and strong verbs in terms of IND, DEP and REL forms (as discussed above), what would be the best way to label the verb form? Starting out with the weak verbs, it has become clear that declaring a form PAST or FUT does not lead very far since the forms are not really marked for tense. Would it be better then, simply to adhere to "walk.IND" vs. "walk.DEP"? This, however, would lead to the assumption that forms such as *choisich* (DEP) would be of the exact same nature in past and in non-past contexts.

The latter approach is not unproblematic, since there is a clear distinction of the above categories when it comes to strong verbs. It would be unreasonable to assume different underlying structures for weak and strong verbs in general, but this is what our first approach would suggest. Otherwise it would not make sense to have a clear distinction between DEP.PAST and DEP.NON-PAST in the case of strong verbs, whereas weak verbs would just be distinguished as to DEP vs. IND.

There seem to be several ways of approaching this problem. First of all, rather than assuming different underlying systems for strong and weak verbs, it could be assumed that it used to be the case that only DEP and IND forms were distinguished in all verbs, and that due to their higher frequency of use, the strong verbs developed into more distinguishable forms over the years to become clearer and more recognisable, while the weak verbs remained with the original distinction. However, the essence of this approach does not lead anywhere, since there is evidence that both strong and weak verbs were marked for past tense from Old Irish onwards, and in fact, the past tense marking for weak verbs used to be even more explicit in Old and Middle Irish (Calder 1972). Therefore it seems that marking of tense was equally strong as marking of mode in the history of ScG, and thus this approach has to be dropped. Nonetheless, it is generally correct that due to their higher frequency of use, the strong verbs developed into more distinguishable forms over the years to become clearer and more recognisable. This phenomenon is not specific to ScG, but occurs in most languages.

Moreover, it would be possible that both strong and weak verbs were once depending on particles to mark them for tense, and that again due to the their high frequency of use, the forms of the strong verbs changed and incorporated parts of the particles so they were no longer needed on their own. However, this approach has to be abandoned too, since there is no evidence that strong verb forms made use of tense marking particles in Old Irish. Nonetheless, it is interesting that in Old Irish and Middle Irish the particle *do* (Old Irish *ro*) was not only used with the dependent form of weak verbs, but also with the independent form (Calder 1972). This indicates a stronger marking of tense than in modern ScG, where the named particle has completely disappeared in the environment of the independent weak verb.

A third possible approach would be to assume that dependent forms of weak verbs simply do not and cannot express tense on their own, and they do not need to, since they operate in combination with other particles and constructions that indicate tense, such as the past tense-indicating particle *do*. Strong verbs function without those particles (and have functioned without them in Old Irish and Middle Irish as well; cf. Calder 1972); tense marking particles would simply be superfluous with them, since their verb forms had become more and more distinguished due to their frequency of use. This approach results to be the most likely, and the reasons for the invalidity of approaches 1 and 2 in fact support approach 3. What is now the independent form of weak verbs in the past tense must formerly have been more like a dependent form, since it has been established that in Old and Middle Irish this ‘independent’ form used to depend on *do* in the past tense, similar to the truly dependent forms. Therefore, tense marking particles used to be necessary for both the dependent and independent form of weak verbs, but apparently not for strong verbs.

At this point it might be worthwhile thinking of comparing those particles (e.g. *do*) to suffixes or prefixes with the same or a similar function in other languages (e.g. *-ed* in English, *-te* in German), usually only used with weak verb forms, too. In the case of Scottish Gaelic, the indicators are not incorporated into the verb, but remain separate, and moreover there is the effect that if there is no particle at all, this also indicates tense: the non-past level. Besides, independent forms of weak verbs do not make use of these particles at all, since they are easily distinguished as they are. The level of DEP/IND distinction does not exist in languages such as English or German, therefore, the comparison cannot go very far, but the underlying idea that other languages deal similarly with weak verbs completes the picture of the particle's function a little.

Which idea would be the right one to adopt now? To what extent do they all fit in with one another? And equally important, how many details will need to be taken into account when it comes to the discussion of a correct and appropriate notation? It might make sense to label verb forms for tense as well as IND/DEP in the notation. In the case of strong verbs, that would be a very natural thing to do because their forms *are* marked for tense, thus the following notation would arise (18c (i) and (ii), repeated here, and with a different notation in (22)):

(18) c. STRONG VERB
i. An tèid thu dhachaigh?
INT **go.FUT** you.SG home
'Will/Do you go home?'
ii. An deach thu dhachaigh?
INT **go.PAST** you.PL home
'Did you go home?'

(22) a. An tèid thu dhachaigh?
INT **go.FUT.DEP** you.SG home
'Will/Do you go home?'
b. An deach thu dhachaigh?
INT **go.PAST.DEP** you.PL home
'Did you go home?'

The problem of labelling dependent forms of weak verbs remains. If the verb as such was marked merely as "walk.DEP" for example, and the particle labelled as "PRT.PAST" (23a), then how could one explain where the future interpretation of the verb comes from in (23b) when there is no such particle as "PRT.FUT" nor a verb marked as "xxx.FUT"?

(23) a. Cha do choisich mi.
NEG **PRT.PAST** walk.**DEP** I
'I didn't walk.'
b. Cha c**h**oisich mi.
NEG walk.**DEP** I
'I will not/do not walk.'

However, one could argue as well that there is no reason to mark the verb for any kind of tense at all, as long as it is clear that it is not in the past tense. That idea would follow from MacAulay's (1996) approach in which he also introduced the terminology of *past vs. non-past* rather than past vs. future/present. That could even lead to the question whether the term "future tense" is of any use at all in a language that uses certain verb forms for both future and present time reference anyway.

Maybe in that case the best solution would be to let go of the term "future" and stick to the distinction of *Past vs. Non-past*, since this is the only distinction that is supported overtly in the Scottish Gaelic verbal system. With that assumption, the notation in (23) makes perfect sense, and thus appears to be the most appropriate one for Scottish Gaelic. Moreover, there is no need to wonder why no future marker goes along with dependent forms, since if there is mainly a binary distinction, it is enough for one side to be clearly distinguished, and in the case of ScG, that is the past tense.

4. Further Discussion

It has become clear that the distinction of independent, dependent, and relative forms is essential in Scottish Gaelic. Far too often has it been tried to analyse verbs in Gaelic using classical grammar categories, based on Latin categories. In the above discussion on the importance of the marking of tense in general, and the extent of it, the degree of importance of the independent, dependent and relative form has clearly shown itself. It is not possible to analyse Gaelic verbs properly without taking into account the named categories.

In that sense Latin-based grammar systems have proved to be unsuitable and insufficient for the verbal system in Scottish Gaelic. They manage to cover some basic features, which, however, do not represent what is characteristic for the Scottish Gaelic verbal system. Therefore, one could try and put verbs into the classical categories of person, number, tense, mode and genus verbi but not much useful information would be gained. The analysis would have to go a step further: Scottish Gaelic needs to be analysed through the discussed independent/dependent/relative forms in order to understand how the actual information on tense, for example, is conveyed.

This leads straight on to the next question, namely, how important the marking of tense is at all in Scottish Gaelic, in comparison to the DEP/IND/REL distinction. Would one go too far if claiming that the marking of the latter is more prominent than the actual marking of tense? This is not easy to decide. It has been discussed in 3.2 that it is of immense importance in Scottish Gaelic to determine whether a verbal form is of a dependent or an independent nature. At the same time, the language itself indicates well whether a certain form is IND or DEP, since the rules for the use of IND vs. DEP forms and their immediate environment are so straightforward. Due to the application of sentence class markers, sentence types are clearly indicated, and it is known which type of sentence demands which form of the verb. Thus the IND/DEP/REL distinction is definitely the most obvious one in the Gaelic verbal system.

However, the conclusion has been established in the previous part that tense and the marking of tense still play an important role. One could imagine the respective categories in a picture: on the one axis, Gaelic could not function without the IND/DEP/REL distinction, but on the other side, some distinction of different tenses is needed in order to enable the language to elaborate, as if it extended its functions to another axis. The main points on that other axis would be "past" and "non-past", apparently the most appropriate tense distinctions in Gaelic (cf. MacAulay 1996).

Since the past tense forms are marked while the non-past verb forms are widely unmarked – at least in the case of weak verbs – the idea is introduced, that tense marking might not appear as prominent in Gaelic, since there is only one kind of tense that is overtly marked on the verb. The dependent forms of weak verbs on the non-past side of the axis are not marked at all, although the non-past category includes more than one type of tense. It has been established that different tenses in the non-past category make use of the same forms and leave it to other parts of the sentence (e.g. adverbials) or simply to the context to convey the respectively intended time reference. Therefore, marking of tense is not as obvious as the marking of DEP/IND forms on the verb itself, and moreover, the different forms of tense are depending on the type of mode of a sentence, since the DEP/IND/REL categories trigger different allomorphs in tense.

Although the independent/dependent/relative distinction appears to be the more prominent one in Gaelic, it is reasonable to consider this DEP/IND/REL distinction to be working together with the equally important yet less obvious tense categories, picturing the whole process as two different but necessary cooperating axes that are needed to make the Scottish Gaelic verbal system work properly.

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Michael Rödel

New Perspectives on Double Perfect Constructions in German

1. Introduction

Seen from a socio-linguistic point of view, double perfect constructions in German are a typical phenomenon of the substandard. Talking about these constructions and its derivates, a friend of mine always says that I occupy myself with the “faults of the German language”. When asked about their usage of the double perfect, nearly all speakers spontaneously reply that they do not use such constructions at all. In reality, it does not take long until they contradict themselves while communicating. Linguistic purists are often amused by the constructions with *gehabt* (had) und *gewesen* (been); the well-known German journalist Bastian Sick even calls them disrespectfully “Hausfrauenperfekt” (the housewife’s perfect). From a scientific point of view, however, such utterances are obsolete since double perfect constructions occur more often than expected and exist in all areas of Germany. The following example is taken from a cycling coverage on TV and it is characteristic for the use in spoken language.

(1) *Bernhard Eisel hat heute keine Chance auf einen Platz ganz vorne.*
Today B.E. has no chance for a very good result.
Er hat *bereits* *bei der ersten Zwischenzeit* *rund zwei Minuten*
He have (3:SG.PRES) already at the first interim time about two minutes
verloren *gehabt.*
lose (PAST PARTICIPLE) have (PAST PARTICIPLE)
(from a “DSF” cycling coverage 12/06/05; B.E. is on the brink of the second interim time).

The history of linguistic research supports the idea that these phenomena belong to the substandard, too. A large amount of different terms is used to denote this construction. The different kinds of terms do not suggest different approaches to the interpretation of this phenomenon but they may be evidence for the inconsistency of the history of research. A phenomenon that can be named so differently over and over again most likely represents a quite unknown and insufficiently analysed phenomenon whose purpose is not understood thoroughly.

At this point Engelien superficially speaks of a “durch *gehabt* verstärkte[n]” – (by *had* supported) perfect (1883: 463), Appuhn (1966) of “hyperperiphrastisch” (hyperperiphrastic). Trier calls such forms “Ultraperfectum” (ultra perfect, 1965: 201), not without adding that he wants this term to be understood in a humorous way. McLintock calls these forms over-composed; similar to the IdS-Grammar (1997, “superkomponiert”/super-composed). They follow – as far as one can talk about that – a minor of several traditions. It probably dates back to Carl Friedrich Aichinger who describes a “Superplusquamperfekt” (super-pluperfect, 1754/1972: 294). This is joined by the rather fresh terms “Perfekt II” and “Plusquamperfekt II” which occur at approximately the same frequency. They appear in Litvinov (1969) for the first time and are primarily popularised in Thieroff's standard work "Das finite Verb im Deutschen" (1992).

Much more often than terms composed with „II" or „super", the designation using "doppel(t)" (double) occurs. Its history dates back to the early period of German grammaticography. As early as 1641, Schottel wrote that in this particular case the auxiliary is used "in a doubled way". No convincing logic can be ascribed to this term (otherwise it would have gained acceptance and would have replaced its competitors more clearly). On semantic grounds, you cannot speak of "doubling" the perfect meaning. Regardless of a range of possible objections against the use of this term, this paper employs the terms "double perfect constructions" and "double perfect" – not least thanks to Litvinov/Radčenko (1998), whose monograph has been the one and only on this topic for a long time.[1]

„Perfect" being a component of the term is taken for granted in this discussion. There is no need to argue here because the existence of a 'normal' perfect is a typological prerequisite for the occurrence of double perfect constructions; the 'normal' perfects are expanded by the participle of the respective auxiliary (*gehabt* respectively *gewesen*). Double perfect constructions are not a phenomenon exclusively restricted to the German language. They are a rather middle European phenomenon which is evident especially in French and its "formes surcomposées". Double perfects are not just restricted to a narrowly defined family of languages. As a matter of fact, there are examples of double perfects in Serbo-Croatian, Afrikaans, in nearly all Romanic languages and dialects and there is even isolated proof of occurences in Hungarian. According to Ammann (2007: 199f.) double perfects also exist in Korean and Basque (which is the only non-Indo-European-language known so far). In German this phenomenon has been neglected for a long time; new editions of grammar books include double perfects in their chapters on tense, but still exclude them from the tense system (e.g., IdS-Grammar 1997).

2. Variations of Double Perfect Constructions

2.1. The double perfect is constructed in the following way:

[finite verb (*haben "have" / sein "be"*) + past participle] + double perfect participle (*gehabt "had" / gewesen "been"*)

It consists of the finite verb form of the auxiliaries *haben* ('have') or *sein* ('be') and the past participle (participle II) of the full verb. The choice of the auxiliary depends on the full verb in use; however, most verbs require the usage of the auxiliary *haben*. This construction is known as a perfect form (as it can be seen in the square brackets). In order to form the double perfect one adds a second participle II *gehabt* ('had') or *gewesen* ('been'), the "double perfect participle". The choice of *gehabt* or *gewesen* depends on the auxiliary in use.[2] Example (1) has already shown a double perfect; the double pluperfect is almost just as frequent. Both phenomena occur correspondingly in their subjunctive mood (3, 4).

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[1] „Doppelperfekt" (and „Doppelplusquamperfekt") appears for example in Wells (1990), Ehrich (1992), Vater (1994), Breuer/Dorow (1996), Langer (2001) and Helbig/Buscha (2001). Gersbach (1982), Eroms (1984), Abraham (1991), Ebert (1993), König (1996) and Takada (1998) are speaking of a „double perfect".

(2) Den Vehfreudigern *hatte* die Regierung *befohlen gehabt*, ein Schulhaus zu bauen, und sie hatten soeben beschlossen, keins zu bauen; …
The government have (3:SG.PAST) order (PP) have (PP) *the Vehfreudiger to build a schoolhouse, but just now they had decided not to build one.*
(Jeremias Gotthelf: Die Käserei in der Vehfreude, zitiert nach http://gutenberg.spiegel.de/buch/2487/3, 07/10/05)

(3) Er *habe* gerade 600 Kilometer *zurückgelegt gehabt*, als er im Regen schleuderte und die Kontrolle über sein Auto verloren habe.
He have (3:SG.PRES.SUBJUNCT) *just* cover (PP) have (PP) *600km, when he went into a skid and lost the control over his car.*
(Neue Zürcher Zeitung, 11/05/05)

(4) Schmidt: Nimmst Du einen Schluck Wasser? (*Would you like to take a sip of water?*)
Gast: Nein, Danke. (*No, thanks*)
Schmidt: Ich *hätte* einen *vorbereitet gehabt*.
Schmidt: *I* have (1:SG.PRET.SUBJUNCT) *one* prepare (PP) have (PP)
(ARD, Harald Schmidt-Show, 31/08/05)

Double perfect and double pluperfect in the indicative are very common in German. In the examples so far, the respective full verb always requires *haben* as perfect auxiliary. There are examples for the "doubling" of the *sein*-perfect as well, which some research classifies as comparatively rare (cf. Breuer/Dorow 1996). It is put into question if these two types of double perfects with *gehabt* or *gewesen* really form one category because their semantics differ slightly from each other. From my point of view, this is not a problem that can be solved by analysing double perfect constructions. It is rather a problem that derives from the German *Perfekt* with its two different auxiliaries. I will get back to this point later.

The double perfect of full verbs like *eintreffen* ('arrive') that require *sein* as auxiliary shows a formal congruence with the construction in sentence (6), whose full verb is *ertappen* ('catch s.o. at doing sth.') and which is traditionally classified as the perfect of a stative passive. Apart from these more common forms there are other double perfect constructions, but they clearly occur at a much lower frequency (7, 8, 9, 10).

(5) [...] und die Mißernte *ist eingetroffen gewesen* […]
…*and the crop failure* be (3:SG.PRES) arrive (PP) be (PP)
(Peter Hacks: Der Müller von Sanssouci, cf. Litvinov/Radčenko 1998)

(6) Kaum hab' ich ein falsches Wort gesagt, *bin* ich auch schon *ertappt gewesen*.
Scarcely have I uttered a false word, be (1:SG.PRES) *I* catch (PP) be (PP)
(from a story about a journey, Regensburg 02/10/05)

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[2] The selection of the perfect auxiliary (*sein/haben*) also determines the double perfect participle (*gewesen/gehabt*).

(7) Im Sommer 1800 war er hauptsächlich mit dieser geschichtlichmoralischen Studie beschäftigt, und er muß ziemlich weit *fortgeschritten gewesen sein*, als ihn im Herbst 1800 das Ausbleiben unentbehrlicher Materialien [...] bestimmte, diese Erzählung auf das folgende Jahr zu verschieben.
In the summer of 1800 […] he must advance (PP) be (PP) be (INF) *quite far, when in autumn 1800 he had to postpone this narrative to the following year due to the lack of essential materials.*
(W. Dilthey: Das Leben Schleiermachers, cf. Litvinov/Radčenko 1998)

(8) Ich hoffe, ich *werde* von Dir *gehört gehabt haben*, bevor du in zwei Jahren vielleicht in die Nähe versetzt wirst.
I hope I will (= FUT.Marker.1:SG.PRES) hear (PP) have (PP) have (INF) *from you before you will be sent into the vicinity in the 2 years*)
(E-Mail, 07/11/05)

(9) ... *verstorben gewesen sein würde*.
…would departed (PP) be (PP) be (INF)
(Litvinov/Radčenko 1998: 27)

(9a) Er *würde* es *gesagt gehabt haben*, wenn er es so gemeint hätte.
He would say (PP) have (PP) have (INF) *so if he really meant it*.
(constructed example)

(10) *... gefragt gehabt habend.*
ask (PP) have (PP) have (PRESENT PARTICIPLE)
(Duden-Grammatik 2005: 470)

Example (7) is a double perfect in the infinitive, which is necessary when combining double perfects with a modal as a finite verb form. An extremely rare double future perfect is to be noted in (8). Here the question arises whether this construction does not only exist as a pun in the quoted e-mail and in constructed grammar examples or whether it also occurs in actual language use. The construction of a double perfect in the infinitive with *würde* (‘would’) is noted by Litvinov/Radčenko (1998). Their reference is taken from Hegel’s “Ästhetik”. A double perfect combined with a present participle (as shown in the latest edition of the Duden-Grammatik) should be classified as hypothetical. The phenomena in sentences 7-10 play quite a minor role, even in the category of double perfect constructions.

3. Traditional Interpretation of Double Perfect Constructions

The quick résumé of the history of designating double perfect constructions has already revealed that this phenomenon found its way into meta-linguistic documents some centuries ago. It was probably first mentioned by Ölinger (1574/1972: 154). Thereupon, double perfect became the topic in a whole range of Early New High German grammar books. Jellinek lists 13 different references (1914: 339f.), among them Aichinger (1754), Schottel (1641 u.a.) and Gottsched (1762) (cf. Rödel 2007). In Stieler (1681 et al.) and de Sumaran (1623), which are both not listed by Jellinek, Langer (2001: 152ff.) has come across double perfect constructions. This fact alone proves that this grammatical construction is an old competitor.

The cause of double perfect construction in German as well as in French is traditionally seen in the decay of the preterite or the so-called “aoristic drift” of the perfect in these languages: in the southern parts of Germany (upper German dialects) the pluperfect formed with the auxiliary *hatte* (which is the preterite of ‘have’) became defective because of the decay of the preterite. A new grammatical form to express anteriority was needed and it was found in the double perfect. In conclusion it can be stated that – according to these traditional theories – the typical usage of the German double perfect can be characterized by two parameters, which are 1. dialectal and upper German, and 2. spoken. The following example which is taken from Felix Huby’s detective novel “Bienzle und die letzte Beichte” is symptomatic. The double perfect occurs specifically in direct speech of a Swabian dialect speaker:

(11) Frau Hertter warf noch einen prüfenden Blick in den Spiegel und drehte sich dann zu Bienzle um. „Er *hat* der Sylvia Zimmermann die Ehe *versprochen gehabt*. Aber wie sie von ihm schwanger geworden ist, hat er sie falle lasse wie eine ausgepresste Zitrone! [...]“
Mrs Hertter looked into the mirror und turned round to Bienzle. “He have (3:SG.PRES) promise (PP) have (PP) *to marry Sylvia Zimmermann. But when she got pregnant, he dropped her like a hot potato.*)

These circumstances caused most Grammarians to deduce a causal connection between the preterite decay and the double perfect. But the following example is one of only a few double perfect constructions from a lower German dialect which have been discovered so far. It was found in a chronicle of Bremen written around 1500 – when in upper German dialects the preterite decay had just started off.

(12) so *hedden* sie den twystryt sunder twiuel *wunnen hat*
they have (3:PL.PAST) *the conflict without any doubt* win (PP) have (PP)
(from the „Bremer Chronik“ 15th or early 16th century, cf. Sarauw 1924: 224)

This is a counter-example to the classical theory. According to this theory there would have been no need to construct a double perfect because the preterite has always been stable in lower German – there was no preterite decay. Thus, this is a rather apparent indication for the connection between the preterite decay and the formation of double perfect being not as explicit as always expected. And there are still a number of indications that oppose the theory of a simple and logical connection between these two phenomena. They shall not be mentioned here in detail, instead I refer to Rödel (2007: 181ff.).

Regardless of the question whether double perfect constructions are to be included into the German tense system or not, a primarily temporal value has almost always been ascribed to them – and this is still the case when studying the most recent contributions to research (Ammann above, Buchwald 2006). Comparing research history with reference to the French “formes surcomposées” seems rather interesting. It can be the case that there is a discrepancy concerning the double perfect in the German and French language respectively. As early as 1966, Appuhn regarded the enormous attention which was paid to such constructions in the French language as inadequate compared to the actual and quite rare usage in daily speech (242). While the German forms bear a temporal value and are classified and put into the category of tense, French researchers prefer putting them into the category of aspect. In the 1960s, Klare and Appuhn comply with the latter tendency in their essays. Appuhn writes that the *formes surcomposées* denote an "aspect d'accomplissement" (240). Indeed, the French publications strongly support the idea of aspect in these constructions. Apart from the afore-mentioned exceptions, this is not the case in the analyses of the German constructions. Before continuing with the analysis of double perfect constructions, some important results should be discussed.

1. The double perfect exists within the whole German language area. There is even proof for double perfects in the history of lower German.[3]
2. The causality between preterite decay and double perfect has to be questioned.
3. Many studies prove that double perfect constructions appear in all registers, above all Litvinov/Radčenko (1998), who show that they are quite rare but existing forms in elevated literature.

4. Morphosyntactic Observations

Regarding the morphology of the construction, the following observation is striking. In practically all spoken (and in all written) modern double perfect examples both participles appear in fixed positions – the participle II of the full verb is followed by the double perfect participle. In the 15th century this was not always the case (13) – and in some dialectal examples this sequence is not always constant either (14).

(13) Er ging in den busch und hort der fogelin sußen singen die yne vor zyten dick *erfrawet hätten gehabt.*
He went into the bush and heard the birds singing, which make (PP) *him happy* have (3:SG.PAST) have (PP) *a long time ago*
(cf. Litvinov/Radčenko 1998: 92)

(14) wie sie na *gewaschen hat gehabt*, ist er nein kohlenkasten geklettert
after clean (PP) have (3:SG.PRES) have (PP), *he went into coal box*
(reference for Thuringian area in Sperschneider 1959: 37))

In dialect research, there are some more references, e.g. in Şandor (2002), who has researched the double perfect forms in Banat. It is to be noted that all of them are structurally congruent, they are positioned in subordinate clauses and the finite auxiliary is found right between the two participles.[4] This observation can serve as indication for the increasing fixation of the position of the auxiliary-participle. Such strong fixation of the position is characteristic of an advanced level in the process of a construction's grammaticalisation. According to the research of grammaticalisation, such a construction with such a fixed position shows no or only sparse limitation in construction. This hypothesis proves to be true when analysing double perfects more closely. Theoretically, all verbs that can form a perfect can also form a double perfect. An exception to the rule are the main verbs *haben* und *sein* which would have to make use of the double perfect participles *gehabt* und *gewesen*. This is a first hint on the distinctive status that both participles occupy (more on that later).

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[3] A geographic overview is given in Rödel (2007: 87). For nearly all areas of the German language proofs have been found in smaller and older studies, e.g., Northern German varieties, Ruhr area, Thuringian, Saxonian, Berlin, Odenwald, Frankonia, Alsatian, "Züritüütsch" (Zurich), Bavarian.

[4] I would like to thank an anonymous reviewer for the hint that word order in dialectal modal constructions is comparable to these examples: "(…), dass sie waschen hat müssen."

Another observation is also remarkable. Double perfect constructions mostly occur in main clauses – in contrast to the pluperfect which prefers subordinate clauses introduced by temporal subjunctions. This, by the way, is another argument against the hypothesis that the double perfect is just a substitute for a pluperfect. The preference of double perfects to appear in German main clauses might be explained by the economic structure of the verb complex in main clauses. As shown in sentence (15), the verbal complex in subordinate clauses is less compact and longer as it can be seen in sentence (15):

(15) …, nachdem er den Film *gesehen gehabt hat*. vs. Er *hat* den Film *gesehen gehabt*. (lit. *After he* have (3:SG.PRES) see (PP) have (PP) *the film*)

Additionally, the usage in main clauses offers another economic advantage. Look at example (16):

(16) Bergmann *ist* oben ganz stark *gefahren* (.) *gewesen*
Bergmann be (3:SG.PRES) *extremely well at the top* skiing (PP) (.) be (PP)
(cf. Ammann 2005))

Sentence (16) is an example taken from a sports coverage on TV. Between the two participles which occur in a fixed position a small break can be noticed: an observation which is quite common for spoken language. The speaking journalist comments on a skiing race, he says that Bergmann had a very good race in the upper part of the course. He notices that a viewer could misunderstand this comment because he might not know if Bergmann is the current racer or if she has already finished. The journalist wants to make his statement clearer and expands the verb form with the double perfect participle. By adding *gewesen* the journalist can ensure that the listener is aware of Bergmann not being the current skier. Thus one can state that the double perfect construction in spoken language offers the possibility to make a statement more precise by adding the second participle. And the addition is still possible while conceptualising a statement. This fact can be considered as an economic advantage that furthermore offers the opportunity to place the double perfect participle in the emphasised final position of a clause. In sentence (16), for example, *gewesen* is emphasised – but this kind of emphasis is only possible in main clauses, not in subordinate clauses.

The two most significant conclusions to be drawn from these considerations are: firstly, double perfect constructions possess a complex but rather inherently fixed structure and secondly, it seems obvious to interpret this structure as an addition of a particular participle (*gehabt/gewesen*) to a perfect form.

	fixed position	
V (FIN) (haben / sein)	**PAST PARTICIPLE**	***gehabt / gewesen***
grammaticalised entity		expansion mechanism for double perfect constructions

Unquestionably, what is worth further discussion is the status of the construction which is known as the basis of the double perfect constructions. The finite form of the auxiliary in combination with the participle of a full verb is considered as a perfect. The perfect being interpreted either as compositional or non-compositional is one of the focal points in linguistic discussion. By using the term "grammaticalised entity", the chart above already points towards a non-compositional analysis. Resorting to the results of diachronic-typological research, there is no way of ignoring the fact that the perfect is to be regarded as less compositional along with an increasing grammaticalisation. Let us start with the auxiliary which has gradually dropped more and more components of its semantics and which is now clearly distinguishable from a full verb (cf. ten Cate 1993). The most striking feature though is conveyed by the advanced development of languages like Russian, in which once there was a perfect which could have been analysed as compositional, but which finally developed into a synthetic past form.

From a particular point of time on, compositional analyses cannot meet the facts of grammaticalisation. They only are truly sustainable in the early stages of the development process of the construction. Such morphologically complex composed "grams" acquiring qualities that cannot be deduced from the individual components show a general tendency of grammaticalised occurrences and are virtually characteristic for the development which the German perfect is undergoing (Dahl 1987: 499). Therefore, Teuber's opinion is that compositional analyses for the *haben*-perfect are doomed to fail:

> Es ist völlig offensichtlich, dass die Grammatikalisierung des Perfekts ein Prozess ist, den das (zukünftige) Hilfsverb *haben* und das Partizip2 gemeinsam und nur gemeinsam durchlaufen. Der Versuch, das Ergebnis dieses Prozesses dann wieder auf Hilfsverb und Partizip2 verteilen zu wollen, ist der Natur der Sache so unangemessen, dass er scheitern muss. (Teuber 2005: 140)

Thus, the perfect is to be interpreted as an analytically realised verb form (cf. Eisenberg 2004) whose semantics is not to be discerned compositionally by the individual components. It is helpful to take a look at chemistry to exemplify the development of the perfect adequately: two elements, a full verb and a past participle, join and react in a process of grammaticalisation. A new entity emerges, whose source materials can still be identified but which represents a completely new unit. This new unit is the starting point for an expansion with the double perfect participles *gehabt* and *gewesen*.

5. Subjunctive Usage

In the German subjunctive mood, the expansions are often obligatory and are accepted by many grammarians (cf. Thieroff 1992: 246ff.). They are found quite regularly in media that claim to use a high stylistic standard.

(17) Er *habe* gerade 600 Kilometer *zurückgelegt gehabt*, als er im Regen schleuderte und die Kontrolle über sein Auto verloren habe.
He have (3:SG.PRES.SUBJUNCT) *just* cover (PP) have (PP) *600km when he went into a skid and lost control over his car.*
(Neue Zürcher Zeitung, 11/05/05)

(18) Er habe gerade 600 Kilometer zurückgelegt, als er im Regen schleuderte und die Kontrolle über sein Auto verloren habe. (same sentence without „have (PP)")

(17) and (18) differ in the respect of placement of point of time when exactly the narrator lost control over his car: in (17), which contains the double perfect, it is the point of time when he had completely covered a distance of 600km, whereas in (18) the accident happened at a not exactly fixed point of time during a journey of 600km. That may have been after half the distance or after 400km (*Er habe gerade eine Strecke von 600 Kilometern zurückgelegt und nach der Hälfte schleuderte er im Regen* – 'He has just covered a journey of 600km and at half distance he went into a skid.'). To be able to transfer anteriority into reported speech, double perfect constructions are often indispensable.

(19) Maria: „Er hat das Buch gelesen." [*Maria: He has read the book*]

This is a 'normal' perfect in direct speech; it carries the typical characteristics of perfect semantics (past reference with a component of current relevance, cf. Lindstedt 2000). Let's look at the effects of the transformation of this sentence into a subjunctive.

(19a) Sie sagte, er habe das Buch gelesen. [*She said that he had read the book*]

In German, indirect speech is usually expressed by the subjunctive. In comparison to the indicative a German speaker would also notice a growing component of (modal) distance in the use of the subjunctive (cf. Rödel 2007: 98ff.). The verb form of this example primarily carries a modal meaning, the temporal meaning is less important. Past reference is less clear compared to the indicative. Grammarians often speak of "weakened temporality" of the German subjunctive (cf. Litvinov/Radčenko 1998: 121). This can be compensated by adding a time adverbial, e.g., "Sommer 2005" as shown in (19b).

(19b) Sie sagte, er habe das Buch im Sommer 2005 gelesen. [*She said that he had read the book in the summer of 2005*]

Now the temporal reference is clearer, though it is not implemented by the grammatical form but by the adverbial. But there is still a possibility left to express the fact that he has completed the reading of the book before the summer of 2005 by adding a double perfect participle (19c).

(19c) Sie sagte, er *habe* das Buch im Sommer 2005 *gelesen gehabt*. (*She said that he* have (3:SG.PRES.SUBJUNCT) *the book just before the summer of 2005* read (PP) have (PP))

There is a difference in truth value conditions between sentences (19b) and (19c). The completion of reading the book before summer 2005 can only be guaranteed by a double perfect construction like (19c). This example shows why double perfect constructions in

German subjunctive are often described as “obligatory”: To generate a clear grammatical anteriority in German subjunctive, one has to fall back to the use of a double perfect form by adding the participles *gehabt* or *gewesen*.

There are reasons why the subjunctive mood was presented before the indicative mood. As a matter of fact, it has been discussed if a clear line has to be drawn between the indicative and subjunctive usage of the double perfect. In the subjunctive mood, the mode of operation of the expansion mechanism shows itself very clearly. Nevertheless, it will be shown as well that this mode of operation is identical for both moods.

6. Analysing the Double Perfect Constructions

The following indicative example is taken from the middle of the corpus:

(20) „Bei den Filmaufnahmen damals haben Sie sehr sportlich gewirkt. Treiben Sie Sport?“ – „Ja, ich spiele leidenschaftlich Fußball (.) und *habe* es auch damals schon *gespielt gehabt*.“
“Back then when shooting the film you seemed to be very sportive. Do you regularly do sports?” – “Yes, I love playing soccer and I have (1:SG.PRES) *soccer back then* play (PP) have (PP)*”)*
(Bayern2Radio, 05/10/2005)

Obviously the speaker chooses a double perfect to emphasise the temporal distance of the situation. It is a subjective classification of the speaker to distance himself from the topic of this sentence, which in my opinion is a phenomenon that could be called “external perspective” (cf. Leiss 1992, the situation is regarded as a whole, which is similar to the perfectivity-concept). One has to state that double perfect is not necessary in this example because one can understand the sentence with a ‘normal’ perfect in the same way. Ammann (2007) calls these usages ‘redundant’.

The next example (21) is from a study of Maiwald about the Middle Bavarian dialect:

(21) Also wenn i \`s Brot knet hob, wenn i’s *knet ghobt hob*, na hab’ i (...)
When I have (1:SG.PRES) knead (PP) *my dough, when I* have (1:SG.PRES) knead (PP) have (PP)*, then…*
(cf. Maiwald 2002)

The most interesting fact of this example is not only the double perfect-usage, but also that a ‘normal’ perfect is used at first and that the speaker adds not only a double perfect participle, but also a subordinate clause with a double perfect. It emphasises the end of the process of kneading the dough as the basis for continuing to bake. This means: When I have finished kneading, I can go on. This example is typical for double perfect uses and I agree with the people on the street that intuitively say that the double perfect transports a meaning of completion. This is also the case in example (22):

(22) Ich *hatte geplant gehabt*, den November da zu verbringen
I have (1:SG.PAST) plan (PP) have (PP) *to spend November there* - but the plan changed)
(nzz.ch, 11/05/2005)

Double perfect constructions typically occur in situations which are completed in the sense that they form the basis for other situations or events in the time before the moment of speaking**.** At this point it is necessary to think about an aspectual analysis.[5] The analysis of example (23) confirms this thesis, although the example does not show a double perfect but a German 'Zustandspassiv' (stative passive) which is expanded by the double perfect participle *gewesen*.

(23) Er *war* im Krieg *gefangen gewesen* und vor Militarismen jeglicher Art hatte sich in ihm eine nahezu hysterische Furcht breitgemacht.
He be (3:Sg.Past) imprison (PP) be (PP) *during the war and an almost hysterical fear of militarism of any kind had spread within him since then.*
(Bayern2Radio, 12/04/06)

The imprisonment is over and is presented as a situation that is located in the past and can be grasped completely. This is typical for perfective grammatical forms.

The problem now at hand is that there is no clear distinction between domains of inherent verb categories. Although information is often specified by context, there are no semantic indicators that show if a form gives information about tense, aspect or mood. The best example is the perfect with its wide range of possible meanings in many languages. The typological research has come to the conclusion that it makes more sense not to separate the categories tense, mood and aspect strictly, but to assume an ATM-continuum (cf**.** Comrie 1976/1985, Bybee/Dahl 1989, Bybee et al. 1994). Research on the double perfect confirms this idea. Double perfects include tense and aspect but when they are analysed, interpretations of aspect work best. This idea turns the world of the German double perfect upside down.

(24) Double perfect constructions first of all serve the purpose of emphasising the perfective aspect of a situation.

The research shows that *gehabt* and *gewesen* implement perfective aspect into the constructions of a finite auxiliary and participle II. They are mechanisms of expansion which can operate on all of these constructions in principle – this also means that the construction presented can be analysed – in contrast to the normal perfect – as compositional. The semantics of the whole double perfect construction has to be described as "past + perfectivity", though there can be various nuances. In some cases the addition of *gehabt* / *gewesen* can implement another level of past. This is in accordance with the observation (for example Abraham 1999) that in principle, aspectual means can be used to generate temporal reference. Double perfects are often used to emphasise perfective contexts, and these mechanisms of expansion are restricted to perfective contexts so far. Therefore one can conclude that double perfect constructions are new grammatical forms which add an aspectual perfective component to a verb form. According to this, *gehabt* and *gewesen* can be regarded as a kind of incompletely grammaticalised aspect marker.

There are some results which prove the special position of these two participles. A first indication has already been the distinctive feature that they themselves cannot be doubled to form a double perfect (**He has had had*). They are out of the ordinary in a diachronic point of view as well. They clearly emerged much later than other participles (Oubouzar 1974/1997, Gronvik 1986, Kuroda 1997, overview in Rödel 2007). According to the conditions of development it was not possible to employ *gehabt* and *gewesen* as participles until the process of auxiliarisation of *haben* and *sein* had advanced. Thus, both *gehabt* and *gewesen* have to be considered as participles of (perfect-)auxiliaries, which claim a special status. That is probably why aspectual semantics is inherent in double perfect participles. Musan (2001: 390) and Wells (1990: 262) state that the participle *gewesen* can express anteriority without employing an auxiliary and Musan demonstrates this by citing a poem (in which such a usage is apparently more likely):

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[5] Schaden (2007) independently reached a similar result in his analysis, even if he denotes the German double perfect as "resultative" (240).

(25) Leuchtende Tage
nicht weinen, da sie vorüber
lächeln, da sie gewesen
(cf. Musan 2001: 390)
Glistening days
do not cry when over,
smile because they were (lit.: *be: PP*)

The following conversation is to elucidate that *gehabt* bears a rather similar meaning. Here the usage of *gehabt* primarily serves to signal the accomplishment of an event or state.

(26) Some youths were playing chess. One (Benjamin) turns around to his girlfriend. Meanwhile, the other one shifts around the chessmen.
Robin: *Benni, ich hab' Schach.* (Benni, I'm giving you Check!)
Benjamin is not reacting.
Robin: *Beeenni, ich hab' Schach.*
Benjamin still does not react, meanwhile someone else runs across the chess board and knocks over all the men.
Robin: *Benni, ich hab' Schach* g'habt. (Benni, I have (FIN) you check *have* (PP) – but there's no proof for it anymore)
(Regensburg 02/10/05)

Bearing in mind the previous section, it becomes clear that the implementation of perfectivity works not only in the indicative but also in the subjunctive mood. Often the expansions with *gehabt* and *gewesen* are used to express tense which is common for perfective forms. In contrast to temporal markers they do not lose their meaning when transferred from indicative into subjunctive mood. The special charm of this analysis of double perfect constructions lies in the discovery of a prototypical core meaning in the firmly perfective component from which different kinds of readings can be deduced. This is obvious for the semantics of fast completion which can be coded by means of the expansion mechanism. But this works as well in the subjunctive mood, in event-consequence-relations, when the past perfect tense is substituted by the double perfect and also when (strictly speaking) the form is used redundantly, i.e., the corresponding normal tense form would have been sufficient to code the situation (cf. Rödel 2007).

7. Is there a Shared Double Perfect Category?

A question already raised in the second section has not yet been answered although it is of central importance. Hundt (2008) has recently put this issue on the agenda and he assumes that the double perfect construction with *sein* could be a matter of reanalysed copula constructions. Indeed, it is correct that the grammatical patterns *sein* + past particple + *gewesen* and *haben* + past participle + *gehabt* can differ in their semantic potential. But the question where this distinguishing semantic potential has its origin needs to be asked as well. In the previous sections I showed that double perfect constructions are an expansion mechanism which implements perfectivity into a construction by inserting a double perfect participle. Additionally, it has become clear that *gehabt* and *gewesen* bear a similar meaning and their implementation leaves comparable – perfective – effects.

Thus, the solution might be found somewhere else. While *haben* + past participle is definitely a perfect in German, in the last few years the debate about the construction of the copula *sein* + past participle emerged within scholarship. One part of this construction (with intransitive full verbs like *fliehen* (flee)) is traditionally categorised as a tense, another part (with a transitive full verb like *streichen* (paint)) as a passive form (cf. Duden 2005: 477f.). Furthermore, there is an inconsistently labelled construction with a past participle of a reflexive verb, which is called "Zustandsreflexiv" (*stative reflexive*) by Helbig/Buscha (2001).

(27) Der Fremde ist (*be* – 3:SG.PRES) geflohen (PP). (*The stranger has fled*)

(28) Die Wand ist (*be* – 3:SG.PRES) gestrichen (PP). (*The wall has been painted*)

(29) Der Junge ist (*be* – 3:SG.PRES) erkältet (PP). (*The boy has caught a cold*)

In the traditional version of German grammar, constructions like (28) are categorised as stative passive when a corresponding *werden*-passive can be formed with this verb (cf. IdS-Grammatik 1997: 1808f., Eisenberg 2004b: 124ff., Helbig/Buscha 2001: 155, Hentschel/Weydt 2003: 134). S*ein* + past participle represents not only a formal but also a functional unit beyond the seemingly categorical border between perfect and stative passive, as emphasised by Litvinov/Nedjalkov (1988). They assigned a resultative semantics to this construction which takes hold of the *sein*-perfect and the stative passive in the same way. Leiss (1992: 156ff.) finally went one step ahead and freed the (morphologically coherent) construction from its categorical disunity by categorising it as a resultative which has to be regarded differently from the *haben*-perfect. So the formal unit corresponds to a functional one. She shows that the effects of the verb-inherent semantics triggers the active or passive readings while the speaker does not realise a categorical difference between 27, 28 and 29.

A further stumbling block is the difficult assessment of the participle when composing the structure. Litvinov/Nedjalkov (1988: 17) admit that many examples imply that we are concerned with adjectival participles. Drawing the line between adjective and participle is complicated (according to Eisenberg 2004b: 124ff., the transition is smooth) and the participles of terminative verbs often develop into adjectives (cf. Leiss 1992). Therefore it stands to reason to regard constructions of *sein* + past participle as constructions of copula and adjectival participle. Teuber (2005) requires this for all of these constructions; Rapp

(1996) considers the perfect as being on the outside, but the stative passive as a copula construction. *Sein* + past participle seems to be an entity worth discussing as it differs from the *haben*-perfect not only morphologically and semantically but also in its syntactic usage. At the same time, one should clearly keep in mind that the vast majority of the German grammaticography deems the traditional categorisation as problematic but hold on to it nonetheless.

The question if constructions with the auxiliary *sein* are also to be considered part of the double perfect constructions like the constructions with *haben* is a question which the category perfect (or what is to be understood by that) of the German language passes onto the double perfect. This question is not to be answered by analysing the double perfect but only by means of the grammatical item, which in the traditional German grammar is commonly designated as perfect. You can even make a well-grounded case that this question comes second place seen from the position of the double perfect construction: for the reason that one can observe that it is possible for the *haben*- and *sein*-perfect, the *haben*- and *sein*-pluperfect as well as the *sein*-passive, both in indicative and subjunctive mood, to expand perfectively. To put it in a nutshell: all constructions with *haben* + past participle and *sein* + past participle can be expanded by *gehabt* resp. *gewesen* to generate perfectivity.

Er	hat	ihn	besiegt	*gehabt*.
He	have (3:SG.PRES)	him	win (PP)	have (PP)

Er	ist	eingeschlafen	*gewesen*.
He	is (3:SG.PRES)	falling asleep (PP)	be (PP)

Er	ist	besiegt	*gewesen*.
He	is (3:SG.PRES)	beat (PP)	be (PP)

Er	ist	groß	*gewesen*.
He	is (3:SG.PRES)	tall (ADJ)	be (PP)

The expansion by the double perfect participle in italics illustrates an almost completely identical perfective meaning – even when keeping a basis of auxiliary and adjective. Hundt (forthcoming) states that the *gewesen*-constructions should not be regarded as double perfect forms but as perfects of predicative copula constructions ("Er ist eingeschlafen gewesen"). That raises the question if the expansion with "gewesen" really implements the meaning which corresponds to the meaning when constructing a perfect with a "normal" participle (like *gegessen* or *eingeschlafen*) – or if we are dealing with an aspectual perfective expansion in this case (*perfect*: er *hat gegessen* vs. *perfective:* er *ist* verschwunden *gewesen*). It seems that semantic differences between the *gehabt*- and the *gewesen*-expansion result from the different kinds of interpretation of this inconsistent perfect category. But it would be too simple to leave it at that as conclusions to be drawn into the opposite direction can definitely be drawn. What is it that one can therefore conclude from the existence of this – almost identical – expansion mechanism about the relationship between *haben*-perfect and *sein*-constructions?

Based on these premises, when studying the line of development which the *haben*-perfect has experienced and bearing in mind that perfects often originate from resultative copula constructions (cf. Bybee et al. 1994/Dahl 1995), one could draw the conclusion that the resultative is generally not only "one of the stations in the (historical) line of development of the perfect" (cf. Litvinov/Nedjalkov 1988: 16) but that the German *sein* + PP–constructions also find themselves in a similar position. Thus, these constructions could be seen as a competitor, as it were, of the *haben* + participle. Having developed earlier than its competitor, its special meaning evolved rather slowly. Additionally, syntactic restrictions were only gradually given up, most likely so slowly that nowadays it is no problem at all to analyse them compositionally (like Teuber 2005) as copula-construction. But there were stages in the linguistic history in which both constructions bore a similarly solid and resultative meaning. Hence, it seems logical that it has become standard to switch to the construction with *sein* for verbs if the *haben*-perfect construction was not available. Later, the construction with *sein* preserved the resulative semantic components to a higher degree. Within this analysis one could therefore speak of a slower developed grammatical suppletive form of the perfect in the German language. At any rate, nowadays it is still possible to tell that the semantics of *haben*- and *sein*-perfects take on different values: spontaneously interviewed test persons recognized a higher current relevance in (31a/b) in comparison to (30a/b) and in this way confirmed the author's intuitive judgement.

(30a) Kathrin hat dem Friseur das Herz gebrochen.
Kathrin has broken the hairdresser's heart.
(30b) Nina hat gelächelt.
Nina (has) smiled
(31a) Er ist (*be* – 3:SG.PRES) erfroren.
He has frozen to death
(31b) Sie ist (*be* – 3:SG.PRES) eingeschlafen.
She has fallen asleep

(31a) and (31b) serve as a replacement for the preterite for *erfror* and *schlief ein* in southern Germany which can be interpreted as a counter-argument to the resultative theory at first sight. Maiwald (2002: 79) does not make out a resultative function any longer in the *sein* + past participle-constructions in upper German. Instead, this construction stands for actions in the past. Then again, the usage as an explicit past form can be regarded as confirmation for the fact that *sein* + past participle moves in the same – and for the perfect distinctive – direction of development (or path of grammaticalisation) as *haben* + past participle. Following this assumption it would only be logical that both constructions develop – via the participle of the auxiliary – an identical pattern for an aspectual expansion.

8. Conclusion

Double perfect constructions do not only occur in the German language but in a wide range of Indo-European languages which, to a certain extent, do not show a close relationship to each other. In other languages the grammatical research is more sensitive for the categorisation of 'aspect'. This probably results in ascribing an aspectual usage to double perfect constructions as a general rule. As opposed to this, such analyses have still remained exceptions for the German language. Rothstein (2008), however, stated that a temporal-aspectual analysis has been attracting more and more supporters. Double perfect constructions were analysed as the addition of an aspectual potential to a temporal basis and thus as an expansion mechanism for the very first time in Rödel (2007). This theory was the result of an analysis of a collection of evidences. A lot of cases which could not be explained by the temporal theory seem to be logical on this basis. It cannot be denied that many double perfect constructions are functionalised for the genesis of temporality. But temporal functionalisiation has cross-linguistically proved to be a feature of aspectual forms. It is especially this kind of functionalisation that is to be perceived in the subjunctive (to a lesser extent in the double pluperfect) since here the expansion by *gehabt* und *gewesen* – along with its perfective content – describes the only possibility to mark anteriority.

The effects of expanding a grammatical form with *gehabt* or *gewesen* are very similar, no matter if the basis is a perfect, a future perfect or even a stative passive. The question arises whether we are not supposed to stipulate two different categories of the double perfect: constructions with *gehabt* and constructions with *gewesen*. In this analysis this problem does not result from the expansion mechanism of double perfect constructions, but derives from the grammatical category perfect. The participles *gehabt* and *gewesen* for themselves are similar in a semantic point of view, but a finite form of *have* and past participle on the one hand and a finite form of *be* and past participle on the other hand create some differences. First of all one has to ask if a single category of perfect in German makes any sense. Some Grammarians have already divided the so-called perfect into two categories, for example *haben*-perfect and resultative.

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C. Tense in Tenseless Languages and Sequence-of-tense Phenomena

Maria Bittner

Time and Modality without Tenses or Modals[1]

1. Introduction

In English, reference to time in discourse involves a grammatical system of tense markers interpreted as temporal anaphors (Reichenbach 1947, Partee 1973, Webber 1988, a.o.). Recently, it has been argued that reference to hypothetical worlds in conditionals involves a parallel grammatical system of modal auxiliaries interpreted as modal anaphors (Stone 1997, Stone/Hardt 1999, Brasoveanu 2007, a.o.). Based on evidence from Kalaallisut (Eskaleut: Greenland), this paper argues that temporal and modal discourse anaphora can be just as precise in a language that does not have either anaphoric tenses or anaphoric modals.

Bittner (2005) shows that future uses of the English modals *will* and *would* have many translation equivalents in Kalaallisut. Most of these are derivational suffixes for prospect-oriented attitudinal states, e.g., expectation (*-ssa*, *-jumaar*), desire (*-ssa*, *-rusuk*, *-juma*), intent (*-niar*, *-jumaar*), need (*-tariaqar*), anxiety (*-qina*), considering the prospect possible (*-sinnaa*), impossible (*-navianngit*), etc. Instead of grammatical tense, the language has a grammatical system of mood inflections that distinguish currently verifiable facts (in the declarative, interrogative, or factual mood) from current prospects (in the imperative, optative, or hypothetical mood). In this system futurity is a species of a fact. For example, the English future *Ole will win* translates into (1)[2], which asserts (*-pu* 'DEC$_{\top}$') that there is a real and current state of expectation (*-ssa* 'exp$^{>}$') that Ann (topic, ⊤) will win. The Kalaallisut attitudinal predicate *-ssa* '-exp$^{>}$' is impersonal, so the attitude holder is unspecified.

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[2] In the Kalaallisut examples, line 1 is in the standard Kalaallisut orthography, line 2 gives the phonemic form of each morpheme, line 3 provides the glosses, and line 4, an English translation equivalent. The glosses are in small caps for inflections (e.g. '-DEC'), lower case for derivational suffixes (e.g. '-not'). Abbreviations: ⊤ = topic, ⊥ = background, bel = believe, exp = expect(ed), des = desire(d), int = intend(ed), obl = obliged.to, att$_{se}$ = attitude *de se*, att$_{\perp}$ = attitude *de* ⊥, att$^{>}$ = attitude to prospect, rem = remote from expected or desired ideal, pssv = passive.

(1) *Aani ajugaassaaq.*
*Aani ajugaa-**ssa**-**pu**-q*
Ann win-exp$^{>}$-DEC$_{T}$-3S
'Ann will win.' (*lit.* is expected to)

Both fact-oriented moods and prospect-oriented attitudes also occur in Kalaallisut conditionals. Both are required even in conditionals about the past, such as the Kalaallisut translations (2)–(3) of the classic examples of Adams (1970).

(2) *Oswaldip* *Kennedy* *toqusimanngippagu*
Oswald-p *Kennedy* *tuqut-sima-nngit-pp-a-gu*
Oswald-ERG Kennedy kill-prf-not-HYP$_{\perp}$-3S$_{\perp}$-3S
inupiloqataata *toqusimassavaa.*
inuk-piluk-qat-a-ata *tuqut-sima-**ssa**-**pa**-a*
man-bad-other-3S$_{\perp}$-ERG kill-prf-exp$^{>}$-DEC$_{T\perp}$-3S.3S
'If Oswald didn't kill Kennedy, then someone else did.'

(3) *Oswaldip* *Kennedy* *toqusimanngikkaluarpagu*
Oswald-p *Kennedy* *tuqut-sima-nngit-galuar-pp-a-gu*
Oswald-ERG Kennedy kill-prf-not-rem-HYP$_{\perp}$-3S$_{\perp}$-3S
inupiloqataata *toqusimassagaluarpaa.*
inuk-piluk-qat-a-ata *tuqut-sima-**ssa**-galuar-**pa**-a.*
man-bad-other-3S$_{\perp}$.ERG kill-prf-exp$^{>}$+rem-DEC$_{T\perp}$-3S.3S
'If Oswald hadn't killed Kennedy, then someone else would've.'

I propose that conditionals, too, introduce real and current attitude states into discourse. In conditionals about the past these are real states of expectation. These real mental states are based on real past events, e.g. the real assassination in (2), or real hate-mongering in (3). The projected consequences of these events in hypothetical antecedent worlds are the modal object of the attitude.

More precisely, I propose that fact-oriented moods in Kalaallisut (e.g. 'DEC' in (1)–(3)) constrain the last eventuality of the verb (here, the state of expectation of 'exp$^{>}$') to be a *currently verifiable fact*. That is, they constrain this eventuality to be already realized, or have at least begun, in the same world as the speech act. The assertion that this eventuality is a fact can therefore be verified here and now, i.e. in the speech world at the speech time.

Next, I build on the aforementioned finding that the English modal *will* translates into Kalaallisut predicates that introduce prospect-oriented attitude states (Bittner 2005). For example, the predicate *-ssa* 'exp$^{>}$' introduces a state of expectation. By discourse-initial default, exemplified in (1), this expectation concerns the immediate future (consequent state) of the speech act (default perspective point), in the common ground (default topical modality and hence the default modal base). The attitude holder's expectations rank the modal base worlds from the most to the least expected. Within the modal base (i.e., the common ground), in the worlds that best fit the attitude holder's expectations, Ann wins within the consequent state of this speech act. The unspecified attitude holder of this real attitudinal state is likely to be the topic (Ann), or the speaker who is making this prediction.

In conditionals, the antecedent clause defeats discourse-initial defaults. Modally, it updates the input modal base to a topical sub-domain (see Lewis 1973, Kratzer 1981, Bittner 2001, a.o.). Temporally, it may update the perspective point. For instance, on the salient reading of the conditional (2), the real state of expectation concerns the consequent state of the real assassination event, in the topical antecedent sub-domain of the common ground where the assassin is not Oswald. Within this topical sub-domain, in the worlds that best fit the attitude holder's expectations, the real assassination time is followed by the consequent state (*-sima* 'prf') of an assassination by another agent.

To extend this approach to counterfactuals, I propose that the suffix *-galuar* 'rem(ote)' is implicitly attitudinal: it indicates that the world of evaluation is not amongst (*remote* from) the ideal worlds, given the ranking of the modal base worlds by contextually salient attitudes (e.g., the beliefs or desires of the speaker or topic). For instance, the counterfactual (3) introduces a real state of expectation concerning the consequent state of a real event—for example, JFK's enemies reaching critical mass—in the modal domain where this event is realized. In the topical sub-domain, which *-galuar* marks as remote from the sub-domain that best fits the speaker's beliefs, JFK is not assassinated by Oswald. Within this remote sub-domain, the expected worlds are those where, as a consequence of his enemies reaching critical mass, JFK is assassinated by some other agent.

In what follows I first introduce an update system that can represent centering-based discourse anaphora (section 2). The above proposal is then empirically supported and formally implemented as explicit updates for sample discourses (sections 3–6) and a CCG fragment (section 7). Finally, I outline an analysis of English tenses and modals in this framework and suggest that they too grammaticalize centering-based anaphora (section 8).

2. Update with centering

2.1. Centering-based anaphora

Grosz *et al* (1995) observed that in English anaphora resolution depends on the relative prominence of potential antecedents. They also introduced the term *center* for the discourse referent in the current center of attention and hence the top-ranked antecedent. Subsequent research has shown that centering is a semantic universal and revealed a great variety of grammatical centering systems (see e.g. Walker 1998, Chen/Yeh 2007).

Kalaallisut explicitly marks current centering status for nominal and modal referents. Nominal centering is marked by obviation (e.g. '3_T' vs. '$3_\perp$', 'FCT$_T$' vs. 'FCT$_\perp$'), whereas modal centering is indicated by grammatical mood (e.g. 'DEC' vs. 'FCT') and grammatical category (e.g. inflection 'DEC' vs. derivation '-not'). Ambiguous English pronouns (e.g. in *Ann's friend has won so* ***she****'s happy*) are typically disambiguated in Kalaallisut. For example, the factual dependent introduces Ann's friend as the topic in (4a) and Ann herself as the topic in (4b). In (4a) Ann is in the background, whereas her friend is in the background in (4b). The subject pronoun in the matrix clause always refers to the topic ('DEC$_T$-3S'). Thus, it unambiguously refers to Ann's friend in (4a), and to Ann, in (4b).

(4) a.	*Aanip*	*ikinngutaa*	*ajugaagami*	*nuannaarpoq.*
	Aani-p	*ikinngut-**a***	*ajugaa-ga-**mi***	*nuannaar-pu-**q***
	Ann-ERG	friend-3S$_{\perp}$	win-FCT$_{\top}$-3S$_{\top}$	happy-DEC$_{\top}$-3S

‘Ann$^{\perp}$’s friend$^{\top}$ has won so she$_{\top}$’s happy.’

b.	*Aanip*	*ikinngunni*	*ajugaammat*	*nuannaarpoq.*
	Aani-p	*ikinngut-**ni***	*ajugaa-mm-**at***	*nuannaar-pu-**q***
	Ann-ERG	friend-3S$_{\top}$	win-FCT$_{\perp}$-3S$_{\perp}$	happy-DEC$_{\top}$-3S

‘Ann$^{\top}$’s friend$^{\perp}$ has won so she$_{\top}$’s happy.’

In general, centering systems contrast the center ($\top$) vs. periphery ($\perp$) of attention. Accordingly, *Update with Centering* (UC) models recentering as update from the input set of *top-bottom lists* ($\top\perp$-lists) to the output set. That is, a state of information is a set of $\top\perp$-lists (adapting Veltman 1996, Dekker 1994). Since discourse initially nominal anaphora is infelicitous, I propose that by default both lists start out empty, as in (5) (ignoring other types of referents). Kalaallisut (4a) and (4b) update this default state of information as in (6a) and (6b). The output state (i.e. output set of $\top\perp$-lists) is spelled out underneath each update. I assume a model where Ann (a) has two friends (f_1 and f_2). One friend has won and is happy (f_1), while Ann herself is not happy, perhaps because she wanted to win. In this model, (4a) is intuitively true, whereas (4b) is false. Formally, the UC representation (6a) yields a non-empty final output state (c_4), whereas (6b) yields the *absurd state* ($c'_4 = \varnothing$).

(5) $\{\langle\langle\rangle, \langle\rangle\rangle\}$

(6a)	$[x\mid x =_i ann]$;	${}^{\top}[x\mid friend\langle x, \perp\delta\rangle]$;	$[win\langle\top\delta\rangle]$;	$[happy\langle\top\delta\rangle]$
	c_1	c_2	c_3	c_4
	$\{\langle\langle\rangle, \langle a\rangle\rangle\}$	$\{\langle\langle f_1\rangle, \langle a\rangle\rangle$ $\langle\langle f_2\rangle, \langle a\rangle\rangle\}$	$\{\langle\langle f_1\rangle, \langle a\rangle\rangle\}$	$\{\langle\langle f_1\rangle, \langle a\rangle\rangle\}$
(6b)	${}^{\top}[x\mid x =_i ann]$;	$[x\mid friend\langle x, \top\delta\rangle]$;	$[win\langle\perp\delta\rangle]$;	$[happy\langle\top\delta\rangle]$
	c'_1	c'_2	c'_3	c'_4
	$\{\langle\langle a\rangle, \langle\rangle\rangle\}$	$\{\langle\langle a\rangle, \langle f_1\rangle\rangle$ $\langle\langle a\rangle, \langle f_2\rangle\rangle\}$	$\{\langle\langle a\rangle, \langle f_1\rangle\rangle\}$	$\varnothing$

Stone/Hardt (1999) analyze so-called ‘sloppy identity’ as anaphora to a center-dependent antecedent plus center-shift. They argue that centering guides all types of anaphora, be it nominal (7a), modal (7b), or temporal (7c). Bittner (2001) adduces crosslinguistic evidence, including ambiguous topic-comment structures like Warlpiri (8), where the topic anaphor (*ngula-ju*) can refer to an individual (A), modality (B), or time (C). Building on these findings, I propose that illocutionary contrasts, e.g. assertion (9a) vs. question (9b), instantiate the centering top-bottom dichotomy in the modal domain.

(7) a. Smith$^{\top}$ spent *his*$_{\top}$ paycheck. Jones$^{\top}$ saved ***it*** (= *his*$_{\top}$ paycheck).
b. Al$^{\top}$ would use slides if *he*$_{\top}$ gave this talk. Bill$^{\top}$ ***would***=n’t (if *he*$_{\top}$ gave this talk).
c. Back then$^{\top}$ you thought I *was*$_{\top}$ crazy. You still$^{\top}$ ***do*** (= think I *am*$_{\top}$ crazy).

(8) Warlpiri (Hale 1976, p.c.)

Maliki-rli	*kaji-ngki*	*yarlki-rni*	*nyuntu*	*ngula-**ju***	*kapi-rna*	*luwa-rni.*
[dog-ERG	CMP-3S.2S	bite-NPST	you]	that-TOP	FUT-1S.3S	shoot-NPST

A. That$^{\mathrm{T}}$ dog that bites you, I'll shoot *it*$_{\mathrm{T}}$.
B. If$^{\mathrm{T}}$ a dog bites you, I'*ll*$_{\mathrm{T}}$ shoot it.
C. When$^{\mathrm{T}}$ the dog bites you, I'*ll*$_{\mathrm{T}}$ shoot it.

(9)

a.	*Aani* *ajugaa-**pu**-q.*		b.	*Aani* *ajugaa-**pi**-a*?	(*Aap.*)
	Ann win-DEC$_{\mathrm{T}}$-3S			Ann win-QUE$_{\mathrm{T}}$-3S	(Yes.)
	'Ann won.'			'Did Ann win?'	(Yes.)

More precisely, I extend the default state (5) with modal referents. If the initial common ground is $p_0 = \{w_0, w_1\}$, the default state is (10). This state is induced by the very act of speaking up ('commonplace effect' of Stalnaker 1978). Suppose Ann won in w_1 and w_2 but not in w_0. Then both the assertion (9a) and the question (9b) are felicitous in this context.

(10) $\langle\langle w_0, p_0\rangle, \langle\rangle\rangle$
$\langle\langle w_1, p_0\rangle, \langle\rangle\rangle$

I propose to analyze both as modal updates. Assertion (11a) reduces the common ground, i.e. the set of topic worlds, from $\{w_0, w_1\}$ in (10) to $\{w_1\}$ in c_2. It also introduces the set of surviving topic worlds as the new primary topic (top referent, $p_1 := \{w_1\}$, in c_3). In contrast, a question is a pure attention update (11b). That is, it does not reduce the common ground ($\{w_0, w_1\}$ in c'_1 through c'_3). Instead, the scope of the question (the proposition that Ann won, $p_1^{+} := \{w_1, w_2\}$) is added to the ⊥-list. This induces a partition of the common ground into a *yes*-cell and a *no*-cell ($p_1 = \{w_1\}$ vs. $\{w_0\}$, adapting Hamblin (1973) and Groenendijk/Stokhof (1994)). If the addressee answers *Yes*, then this assertion reduces the common ground to the *yes*-cell (c'_4) and introduces this modality as the new primary topic ($p_1 := \{w_1\}$ in c'_5). Thus, a question+*yes* answer updates information and the primary topic like a plain assertion, but questions introduce additional modal referents (e.g. p_1^{+} in c'_3).

(11a)	$^{\mathrm{T}}[x\vert\, x =_i \mathit{ann}];$	$[\mathit{win}_{\top\omega}\langle\top\delta\rangle];$	$^{\mathrm{T}}[p\vert\, p = \top\omega\Vert]$
	c_1	c_2	c_3
	$\langle\langle a, w_0, p_0\rangle, \langle\rangle\rangle$		
	$\langle\langle a, w_1, p_0\rangle, \langle\rangle\rangle$	$\langle\langle a, w_1, p_0\rangle, \langle\rangle\rangle$	$\langle\langle p_1, a, w_1, p_0\rangle, \langle\rangle\rangle$

(11b)	$^{\mathrm{T}}[x\vert\, x =_i \mathit{ann}];$	$[w\vert\, \mathit{win}_w\langle\top\delta\rangle];$	$[p\vert\, p = \bot\omega\Vert]$
	c'_1	c'_2	c'_3
	$\langle\langle a, w_0, p_0\rangle, \langle\rangle\rangle$	$\langle\langle a, w_0, p_0\rangle, \langle w_1\rangle\rangle$	$\langle\langle a, w_0, p_0\rangle, \langle p_1^{+}, w_1\rangle\rangle$
		$\langle\langle a, w_0, p_0\rangle, \langle w_2\rangle\rangle$	$\langle\langle a, w_0, p_0\rangle, \langle p_1^{+}, w_2\rangle\rangle$
	$\langle\langle a, w_1, p_0\rangle, \langle\rangle\rangle$	$\langle\langle a, w_1, p_0\rangle, \langle w_1\rangle\rangle$	$\langle\langle a, w_1, p_0\rangle, \langle p_1^{+}, w_1\rangle\rangle$
		$\langle\langle a, w_1, p_0\rangle, \langle w_2\rangle\rangle$	$\langle\langle a, w_1, p_0\rangle, \langle p_1^{+}, w_2\rangle\rangle$
	$(c'_4$		$c'_5)$
	$[\top\omega \in_i \bot\Omega]$		$^{\mathrm{T}}[p\vert\, p = \top\omega\Vert]$
	$\langle\langle a, w_1, p_0\rangle, \langle p_1^{+}, w_1\rangle\rangle$		$\langle\langle p_1, a, w_1, p_0\rangle, \langle p_1^{+}, w_1\rangle\rangle$
	$\langle\langle a, w_1, p_0\rangle, \langle p_1^{+}, w_2\rangle\rangle$		$\langle\langle p_1, a, w_1, p_0\rangle, \langle p_1^{+}, w_2\rangle\rangle$

This has implications for modal anaphora. For example, assuming that a conditional gets its modal base by anaphora (Kratzer 1981, Stone 1997), we correctly predict that the antecedent can be a question (12a), or another source of a propositional referent (e.g. (12b, c)).

(12) a. (*Did* Oswald shoot Kennedy?) Well, *if* he had, someone would've seen him. So I don't believe *it*.
b. Oswald did=*n't* shoot Kennedy. *If* he had, someone would've seen him.
c. Kennedy was shot *because* he had enemies. *If* Oswald hadn't shot him, someone else would have.

In what follows I formally define *Update with Modal Centering* (UC_ω, section 2.2) and DRT-style abbreviations used above (section 2.3). I then extend UC_ω with temporal referents so that we can represent centering-based anaphora across domains (section 2.4).

2.2. *Update with Modal Centering* (UC_ω)

Update with Centering (UC) is an update system designed to represent centering-based discourse anaphora and to allow direct type-driven composition. To accomplish these goals, UC combines type logic (adapting Muskens 1995, 1996) with update semantics (adapting Veltman 1996). That is, the meaning of a sentence updates an input state of information to the output state. Centering is analyzed as list-based anaphora (adapting Dekker 1994). More precisely, a state of information is a set of $\top\bot$-*lists* of ranked semantic objects that are available for anaphoric reference (*discourse referents*). Each $\top\bot$-list is a pair of two sequences of objects: an $\top$-*list*, representing ranked referents for top-anaphors (e.g. '$3\mathrm{s}_\top$'), and $\top\bot$-*list*, representing ranked referents for bottom anaphors (e.g. '$3\mathrm{s}_\bot$').

DEFINITION 1 (lists and info-states) Given a non-empty set D of objects:

- $D^{n,m} = D^n \times D^m$ is the set of $\top\bot$-*lists* of n $\top$-*objects* and m $\bot$-*objects*.
- For any $\top\bot$-list $\mathrm{i} \in D^{n,m}$, $\top\mathrm{i} := \mathrm{i}_1$ and $\bot\mathrm{i} := \mathrm{i}_2$. Thus, $\mathrm{i} = \langle \top\mathrm{i}, \bot\mathrm{i} \rangle$.
- An (n, m)-*info-state* is any subset of $D^{n,m}$. The empty set, $\varnothing$, is the *absurd state*.

UC_ω represents discourse reference to *individuals* (δ), *worlds* (ω), and *propositions* ($\Omega := \omega t$). That is, a non-empty $\top\bot$-list consists of semantic objects of these types. An $\top\bot$-list is itself a semantic object (of type s), but not a discourse referent ($s \notin \mathrm{DR}(\Theta)$).

DEFINITION 2_ω (UC_ω types). The set of UC_ω *types* Θ is the smallest set such that (i) $\delta, \omega, t, s \in \Theta$, and (ii) $(ab) \in \Theta$ if $a, b \in \Theta$. The subset $\mathrm{DR}(\Theta) = \{\delta, \omega, \omega t\}$ is the set of *discourse referent types* within Θ.

In UC_ω-frames, D_s is the domain of $\top\bot$-lists. It consists of all the pairs of sequences of objects of referent types ($\mathrm{DR}(\Theta) = \{\delta, \omega, \omega t\}$), including the empty $\top\bot$-list, $\langle\langle\rangle, \langle\rangle\rangle$. A model for UC_ω consists of a UC_ω-frame and an interpretation of non-logical constants.

DEFINITION 3 (UC_ω frames). A UC_ω frame is a set $\{D_a | a \in \Theta\}$ of non-empty pairwise disjoint sets D_a such that (i) $D_t = \{1, 0\}$, (ii) $D_{ab} = \{f | \varnothing \subset \mathrm{Dom}\, f \subseteq D_a \,\&\, \mathrm{Ran}\, f \subseteq D_b\}$, and (iii) $D_s = \cup\{D^{n,m} | 0 \leq n \,\&\, 0 \leq m\}$, where $D = \cup\{D_a | a \in \mathrm{DR}(\Theta)\}$

DEFINITION 4_ω (UC_ω models). A UC_ω model is a pair $M = \langle\{D_a | a \in \Theta\}, [\![\cdot]\!]\rangle$ such that $\{D_a | a \in \Theta\}$ is a UC_ω frame and for all $A \in Con_a$, $[\![A]\!] \in D_a$.

The basic terms of UC$_\omega$ are variables and non-logical constants. The syntactic definition (D5$_\omega$) builds complex terms by means of six standard rules of type logic (i–vi) and three centering rules (vii–ix). The centering rule (vii) combines a referent-valued variable and an $\top\bot$-list into an extended $\top\bot$-list. Rule (viii) builds local anaphors (e.g. $\top a_n$ for the *n*th object of type *a* on the $\top$-list of the input $\top\bot$-list). Finally, rule (ix) builds global anaphors (e.g. $\top a_n\{I_{st}\}$ for the entire set of $\top a_n$-objects on all the $\top\bot$-lists of the input state *I*). For any assignment *g*, UC$_\omega$ semantics (D6$_\omega$) extends the interpretation of constants, $[\![\cdot]\!]$, to all terms, $[\![\cdot]\!]^g$. Rules (i-vi) are standard. (We write '$X \doteq Y$' for '*X* is *Y*, if *Y* is defined, else *X* is undefined'. We also use the von Neumann definition of truth values, so $1 := \{\varnothing\}$ and $0 := \varnothing$.) In the centering rule (vii), $(\mathrm{d} \oplus \mathrm{z}) := \langle \mathrm{d}, \mathrm{z}_1, \ldots, \mathrm{z}_n\rangle$ for any object d and sequence z. That is, the object $g(u_a)$ is added to the specified sublist of the input $\top\bot$-list $[\![B]\!]^g$. In (viii), $(\mathrm{z})_n$ denotes the *n*th coordinate of z, and $(\mathrm{z})_a$, the sub-sequence of type *a* coordinates of z. That is, $\top a_n$ (or $\bot a_n$) denotes the *n*th *a*-object on the $\top$-list (or $\bot$-list), if there is such an object, and fails to denote otherwise. Finally, rule (ix) says that $A\{B\}$ denotes the *global value* of the anaphor A_{sa} in state B_{st}, i.e. (the characteristic function of, ${}^{\chi}(\cdot)$) the set of all the *A*-objects on all the $\top\bot$-lists in (the set characterized by, ${}^{\{\}}(\cdot)$) *B* (adapting van den Berg 1996).

DEFINITION 5$_\omega$ (UC$_\omega$-syntax). For any type $a \in \Theta$, define the set of *a*-terms, $Term_a$:

i. $Con_a \cup Var_a \subseteq Term_a$
ii. $\lambda u_a(B) \in Term_{ab}$, if $u_a \in Var_a$ and $B \in Term_b$
iii. $BA \in Term_b$, if $B \in Term_{ab}$ and $A \in Term_a$
iv. $(A = B) \in Term_t$, if $A, B \in Term_a$
v. $\neg\varphi, (\varphi \rightarrow \psi), (\varphi \wedge \psi), (\varphi \vee \psi) \in Term_t$, if $\varphi, \psi \in Term_t$
vi. $\forall u_a\varphi, \exists u_a\varphi \in Term_t$, if $u_a \in Var_a$ and $\varphi \in Term_t$
vii. $(u_a{}^{\top}\!\oplus B), (u_a{}^{\bot}\!\oplus B) \in Term_s$, if $a \in \mathrm{DR}(\Theta)$, $u_a \in Var_a$, and $B \in Term_s$
viii. $\top a_n, \bot a_n \in Term_{sa}$, if $a \in \mathrm{DR}(\Theta)$ and $n \geq 1$.
ix. $A\{B\} \in Term_{at}$, if $a \in \mathrm{DR}(\Theta)$, $A \in Term_{sa}$, and $B \in Term_{st}$

DEFINITION 6$_\omega$ (UC$_\omega$ semantics). For any $M = \langle\{D_a | a \in \Theta\}, [\![\cdot]\!]\rangle$ and *g*:

i. $[\![A]\!]^g = [\![A]\!]$ if $A \in Con_a$
$\quad = g(A)$ if $A \in Var_a$
ii. $[\![\lambda u_a(B)]\!]^g(\mathrm{d}) \doteq [\![B]\!]^{g[u/\mathrm{d}]}$ if $\mathrm{d} \in D_a$
iii. $[\![BA]\!]^g \doteq [\![B]\!]^g([\![A]\!]^g)$
iv. $[\![A = B]\!]^g = 1$ iff $[\![A]\!]^g, [\![B]\!]^g \in D_a$ & $[\![A]\!]^g = [\![B]\!]^g$
v. $[\![\neg\varphi]\!]^g \doteq 1\backslash[\![\varphi]\!]^g$
$[\![\varphi \rightarrow \psi]\!]^g \doteq 1\backslash([\![\varphi]\!]^g\backslash[\![\psi]\!]^g)$
$[\![\varphi \wedge \psi]\!]^g \doteq [\![\varphi]\!]^g \cap [\![\psi]\!]^g$
$[\![\varphi \vee \psi]\!]^g \doteq [\![\varphi]\!]^g \cup [\![\psi]\!]^g$
vi. $[\![\forall u_a\varphi]\!]^g \doteq \cap\{[\![\varphi]\!]^{g[u/\mathrm{d}]}: \mathrm{d} \in D_a\}$
$[\![\exists u_a\varphi]\!]^g \doteq \cup\{[\![\varphi]\!]^{g[u/\mathrm{d}]}: \mathrm{d} \in D_a\}$
vii. $[\![u_a{}^{\top}\!\oplus B]\!]^g \doteq \langle(g(u_a) \oplus \top[\![B]\!]^g), \bot[\![B]\!]^g\rangle$
$[\![u_a{}^{\bot}\!\oplus B]\!]^g \doteq \langle\top[\![B]\!]^g, (g(u_a) \oplus \bot[\![B]\!]^g)\rangle$
viii. $[\![\top a_n]\!]^g(\mathrm{i}) \doteq ((\top\mathrm{i})_a)_n$ if $\mathrm{i} \in D_s$
$[\![\bot a_n]\!]^g(\mathrm{i}) \doteq ((\bot\mathrm{i})_a)_n$ if $\mathrm{i} \in D_s$
ix. $[\![A\{B\}]\!]^g \doteq {}^{\chi}\{[\![A]\!]^g(\mathrm{j}) | \mathrm{j} \in {}^{\{\}}[\![B]\!]^g\}$

A *context* of utterance is a pair of a non-empty set of worlds (p_0, initial *common ground*) and an individual who is known to be speaking (the *speaker*, denoted by the δ-constant $\textsc{i}$ and constrained by the $\omega\delta t$-predicate *speak*). The common ground determines the *default state*, ${}^{st}\mathrm{p}_0$. By default, the common ground p_0 is the topical proposition, i.e. the $\top\Omega_1$-object. Moreover, for each common ground world (candidate for the speech world), there is some $\top\bot$-list in the default state where that world is the local topic world, i.e. the $\top\omega_1$-object.

DEFINITION 7_ω (contexts and defaults). For a model $M = \langle\{D_a | a \in \Theta\}, [\![\cdot]\!]\rangle$,

i. An *M-context* is a pair $\langle \mathrm{p}_0, [\![\textsc{i}]\!]\rangle \in D_{\omega t} \times D_\delta$ such that (a) ${}^{\{\}}\mathrm{p}_0 \neq \varnothing$ and (b) $\forall[\mathrm{w} \in {}^{\{\}}\mathrm{p}_0: [\![\textsc{i}]\!] \in {}^{\{\}}[\![\mathit{speak}]\!](\mathrm{w})$

ii. ${}^{st}\mathrm{p}_0 = {}^{\chi}\{\langle\langle \mathrm{w}, \mathrm{p}_0\rangle, \langle\,\rangle\rangle | \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\}$ is the p_0-*default* (*info-*)*state*.

The content of what is said updates the default state. For any input state of information c (set of $\top\bot$-lists), a term φ of type (*st*)*st* (representation of a sentence) is assigned a truth value just in case it updates the primary topic to a proposition ($\mathrm{TOP}_{M,\,\mathrm{c}}\ \varphi = \{\mathrm{p}\}$). In that case, the topical proposition is the set of worlds where φ is true; in all other worlds, φ is false.

DEFINITION 8 (topic-set, truth). For a model *M*, info-state c, and (*st*)*st* term φ:

i. $\mathrm{TOP}_{M,\,\mathrm{c}}\ \varphi = \{(\top \mathrm{j})_1 | \mathrm{j} \in D_s\backslash{}^{\{\}}\mathrm{c}\ \&\ \forall[g: \mathrm{j} \in {}^{\{\}}[\![\varphi]\!]^g(\mathrm{c})\}$

ii. φ is *true* relative to *M* and c at world w iff $\exists \mathrm{p} \in D_{\omega t}$: $\mathrm{TOP}_{M,\,\mathrm{c}}\ \varphi = \{\mathrm{p}\}\ \&\ \mathrm{w} \in {}^{\{\}}\mathrm{p}$

iii. φ is *false* relative to *M* and c at world w iff $\exists \mathrm{p} \in D_{\omega t}$: $\mathrm{TOP}_{M,\,\mathrm{c}}\ \varphi = \{\mathrm{p}\}\ \&\ \mathrm{w} \notin {}^{\{\}}\mathrm{p}$

2.3. DRT-style abbreviations

For the sake of readability, we follow the usual practice (Muskens 1996, Stone 1997, a.o.) and introduce a system of DRT-style abbreviations. For example, in section 2.1 we used some abbrevations defined in Table 1. Further abbreviations will be introduced as needed.

Table 1. DRT-notation for $\mathrm{UC}_{(\omega)}$-terms

- static relations ($a \in \mathrm{DR}(\Theta)$)

$A_a \in B_{at}$	for	BA
$A_a \notin B_{at}$	for	$\neg BA$
$A_{at} \subseteq B_{at}$	for	$\forall[u_a(u \in A \rightarrow u \in B)$
$B(A_1, \ldots, A_n)$	for	$BA_1 \ldots A_n$

- local projections, conditions, and updates ($a \in \mathrm{DR}(\Theta)$, $\mathbf{R} \in \{=, \in, \notin, \subseteq\}$)

$\top a,\ \bot a$	for	$\top a_1,\ \bot a_1$
$A_a{}^{\circ}, A_{sa}{}^{\circ}$	for	$\lambda i_s.\ A,\ \lambda i_s.\ Ai$
$B\,\mathbf{R}_i\,A$	for	$\lambda i_s.\ B^{\circ}i\ \mathbf{R}\ A^{\circ}i$
$B_W\langle A_1, \ldots A_n\rangle$	for	$\lambda i_s.\ B(W^{\circ}i, A_1{}^{\circ}i, \ldots A_n{}^{\circ}i)$
$[C]$	for	$\lambda I_{st}\lambda j_s.\ Ij \wedge Cj$
${}^{\top}[u_1 \ldots u_n \mid C]$	for	$\lambda I_{st}\lambda j_s.\ \exists u_1 \ldots u_n \exists i_s(j = (u_1 {}^{\top}\!\oplus \ldots (u_n {}^{\top}\!\oplus i)) \wedge Ii \wedge Ci)$
$[u_1 \ldots u_n \mid C]$	for	$\lambda I_{st}\lambda j_s.\ \exists u_1 \ldots u_n \exists i_s(j = (u_1 {}^{\bot}\!\oplus \ldots (u_n {}^{\bot}\!\oplus i)) \wedge Ii \wedge Ci)$

- global updates ($a \in \mathrm{DR}(\Theta), \mathbf{R} \in \{=, \in, \notin, \subseteq\}$)

$[A\,\mathbf{R}\,B\|]$ for $\lambda I_{st}\lambda j_s.\ Ij \wedge Aj\,\mathbf{R}\,B\{I\})$

$[A\|\,\mathbf{R}\,B\|]$ for $\lambda I_{st}\lambda j_s.\ Ij \wedge A\{I\}\,\mathbf{R}\,B\{I\})$

${}^{\mathrm{T}}[u_a|\ u\,\mathbf{R}\,A\|]$ for $\lambda I_{st}\lambda j_s.\ \exists u_a \exists i_s(j = (u\ {}^{\mathrm{T}}\!\oplus i) \wedge Ii \wedge u\,\mathbf{R}\,A\{I\})$

$[u_a|\ u\,\mathbf{R}\,A\|]$ for $\lambda I_{st}\lambda j_s.\ \exists u_a \exists i_s(j = (u\ {}^{\perp}\!\oplus i) \wedge Ii \wedge u\,\mathbf{R}\,A\{I\})$

$(J_{(st)st}\ ;\ K_{(st)st})$ for $\lambda I_{st}\lambda j_s.\ (K(JI))j$

By way of illustration, consider again the representations of assertions and question-answer pairs proposed in (11a, b). The proposed UC$_\omega$ representations, in the above DRT-notation, are repeated in (13) and (14) together with the glosses of the respective examples:

(13) Ann win-DEC$_{\mathrm{T}}$-3S
${}^{\mathrm{T}}[x|\ x =_i ann];\ [win_{\mathrm{T}\omega}\langle\top\delta\rangle];\ {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

(14) Ann win-QUE$_{\mathrm{T}}$-3S? Yes.
${}^{\mathrm{T}}[x|\ x =_i ann];\ [w|\ win_w\langle\top\delta\rangle];\ [p|\ p = \bot\omega\|];\ \ [\top\omega \in_i \bot\Omega];\ {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

In the case of assertion (13), the first box adds Ann to the ⊤-list (15). The second box tests that this topical individual ($\top\delta$) won in the local topic world ($\top\omega$), reducing the common ground ($\top\omega\|$) to the worlds that pass this test (16). The last box introduces the updated common ground as the new primary topic (17). The truth definition (D8) then correctly predicts that assertions have truth values and assigns the correct truth condition.

(15) $({}^{st}\mathrm{p}_0)\,[\![{}^{\mathrm{T}}[x|\ x =_i a]\,]\!]^g$ $=: \mathrm{c}_1$
$:=$ $[\![\lambda I_{st}\lambda j_s.\ \exists x \exists i_s(j = (x\ {}^{\mathrm{T}}\!\oplus i) \wedge Ii \wedge x = a)\,]\!]^g({}^{st}\mathrm{p}_0)$
$=$ ${}^{\chi}\{\langle\langle \mathrm{a, w, p_0}\rangle, \langle\,\rangle\rangle|\ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\ \&\ \mathrm{a} = [\![a]\!]\}$

(16) $\mathrm{c}_1[\![\,[win_{\mathrm{T}\omega}\langle\top\delta\rangle]\,]\!]^g$ $=: \mathrm{c}_2$
$:=$ $[\![\lambda I_{st}\lambda j_s.\ Ij \wedge win(\top\omega_1 j,\ \top\delta_1 j)\,]\!]^g(\mathrm{c}_1)$
$=$ ${}^{\chi}\{\langle\langle \mathrm{a, w, p_0}\rangle, \langle\,\rangle\rangle|\ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\ \&\ \mathrm{a} = [\![a]\!]\ \&\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{w})\}$

(17) $\mathrm{c}_2[\![{}^{\mathrm{T}}[p|\ p = \top\omega\|]\,]\!]^g$ $=: \mathrm{c}_3$
$:=$ $[\![\lambda I_{st}\lambda j_s.\ \exists p \exists i_s(j = (p\ {}^{\mathrm{T}}\!\oplus i) \wedge Ii \wedge p = \top\omega_1\{I\})]\!]^g(\mathrm{c}_2)$
$=$ ${}^{\chi}\{\langle\langle \mathrm{p_1, a, w, p_0}\rangle, \langle\,\rangle\rangle|\ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\ \&\ \mathrm{a} = [\![a]\!]\ \&\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{w})$
$\&\ \mathrm{p}_1 = {}^{\chi}\{\mathrm{w'} \in {}^{\{\}}\mathrm{p}_0|\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{w'})\}\}$

In the related question (14), the first update is again (15) (hence $\mathrm{c}'_1 = \mathrm{c}_1$). However, the other two boxes are pure attention updates. Both add modal referents to the ⊥-list: first, all of the possible worlds where Ann wins (18), and then, the entire set of these worlds, i.e. the proposition that Ann won (19).

(18) $\mathrm{c}'_1[\![\,[w|\ win_w\langle\top\delta\rangle]\,]\!]^g$ $=: \mathrm{c}'_2$
$:=$ $[\![\lambda I_{st}\lambda j_s.\ \exists w \exists i_s(j = (w\ {}^{\perp}\!\oplus i) \wedge Ii \wedge win(w,\ \top\delta_1 i))\,]\!]^g(\mathrm{c}'_1)$
$=$ ${}^{\chi}\{\langle\langle \mathrm{a, w, p_0}\rangle, \langle \mathrm{v}\rangle\rangle|\ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\ \&\ \mathrm{a} = [\![a]\!]\ \&\ \mathrm{v} \in D_\omega\ \&\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{v})\}$

(19) $\mathrm{c}'_2[\![\,[p|\ p = \bot\omega\|]\,]\!]^g$ $=: \mathrm{c}'_3$
$:=$ $[\![\lambda I_{st}\lambda j_s.\ \exists p \exists i_s(j = (p\ {}^{\perp}\!+ i) \wedge Ii \wedge p = \bot\omega_1\{I\})]\!]^g(\mathrm{c}'_2)$
$=$ ${}^{\chi}\{\langle\langle \mathrm{a, w, p_0}\rangle, \langle \mathrm{p}_1{}^{+}, \mathrm{v}\rangle\rangle|\ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\ \&\ \mathrm{a} = [\![a]\!]\ \&\ \mathrm{v} \in D_\omega\ \&\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{v})$
$\&\ \mathrm{p}_1{}^{+} = {}^{\chi}\{\mathrm{v'} \in D_\omega|\ \mathrm{a} \in {}^{\{\}}[\![win]\!]\,(\mathrm{v'})\}\}$

This analysis captures the intuition that a question adds no information (i.e. does not reduce the common ground), and that the issue of truth value does not arise (given the truth definition D8). In contrast, the answer to a question is informative and does have a truth value. In the present theory, this is because the answer reduces the common ground (20) and introduces the updated common ground as the new primary topic (21). The relation of an elliptic answer to the question is analyzed as centering-based modal anaphora.

$$
\begin{array}{lll}
(20) & c'_3[\![\,[\top\omega\in_i \bot\Omega]]\!]^g & =: c'_4 \\
 & := \quad [\![\lambda I_{st}\lambda j_s.\ Ij \wedge \top\omega_1 j \in \bot\Omega_1 j)\,]\!]^g(c'_3) & \\
 & = \quad {}^{\chi}\{\langle\langle a, w, p_0\rangle, \langle p_1^{+}, v\rangle\rangle|\ w \in {}^{\{\}}p_0\ \&\ a = [\![a]\!]\ \&\ v \in D_\omega\ \&\ a \in {}^{\{\}}[\![win]\!](v) & \\
 & \qquad \&\ p_1^{+} = {}^{\chi}\{v' \in D_\omega|\ a \in {}^{\{\}}[\![win]\!](v')\}\ \&\ w \in {}^{\{\}}p_1\} & \\
(21) & c'_4[\![{}^{\top}[p|\ p = \bot\omega\|]]\!]^g & =: c'_5 \\
 & := \quad [\![\lambda I_{st}\lambda j_s.\ \exists p\exists i_s(j = (p\ {}^{\top}\!\oplus i) \wedge Ii \wedge p = \top\omega_1\{I\})]\!]^g(c'_4) & \\
 & = \quad {}^{\chi}\{\langle\langle p_1, a, w, p_0\rangle, \langle p_1^{+}, v\rangle\rangle|\ w \in {}^{\{\}}p_0\ \&\ a = [\![a]\!]\ \&\ v \in D_\omega\ \&\ a \in {}^{\{\}}[\![win]\!](v) & \\
 & \qquad \&\ p_1^{+} = {}^{\chi}\{v' \in D_\omega|\ a \in {}^{\{\}}[\![win]\!](v')\}\ \&\ a \in {}^{\{\}}[\![win]\!](w) & \\
 & \qquad \&\ p_1 = {}^{\chi}\{v' \in {}^{\{\}}p_0|\ a \in {}^{\{\}}[\![win]\!](v')\}\} &
\end{array}
$$

In what follows UC_ω serves to represent nominal and modal reference in discourse. To factor in temporal reference we define an extension of this update system.

2.4. General *Update with Centering* (UC)

General *Update with Centering*, UC, extends UC_ω with three types of discourse referents: events (ε), states (σ), and times (τ).

DEFINITION 2 (UC types). The set of UC types Θ is the smallest set such that (i) $\delta, \varepsilon, \sigma, \tau, \omega, t, s \in \Theta$, and (ii) $(ab) \in \Theta$ if $a, b \in \Theta$. The subset $\text{DR}(\Theta) = \{\delta, \varepsilon, \sigma, \tau, \omega, \omega t\}$ is the set of *discourse referent types* within Θ.

UC-terms are interpreted on the same frames as UC_ω (D3 in section 2.2), but in richer models. In natural language discourse time behaves like a chain of discrete instants (see Kamp 1979, Bittner 2008, a.o.). For simplicity, I model discourse time using integers (as in D4.ii). A *discourse instant* is a set of one integer (e.g. {3}), whereas a *discourse period* is a set of successive integers (e.g. {4, 5}). A discourse time t *precedes* t', written $t <_\tau t'$, iff every integer in t precedes every integer in t'. In addition, UC has a set of time-related logical operators (see D4.iii). First of all, for any world w, the *run time* operator ϑ maps any eventuality in w to its run time in w. If the eventuality is an event, then its run time in any world is a discourse instant, $\{n\}$, and its *consequent state* (CON) begins at the next instant, $\{(n + 1)\}$. If the eventuality is a state, then its run time in any world is a discourse period, and its *beginning* (BEG) and *end* (END) are events that begin and end that period. Some eventualities have a *central individual* (CTR). In particular, verbal predicates (i.e. constants of type $\omega a\delta\ldots t$, where $a \in \{\varepsilon, \sigma\}$) center their eventuality argument on their first individual argument. Eventuality-valued operators (CON, BEG, END) preserve this nominal centering. In addition, some eventualities may have a contrasting *background individual* (BCK).

DEFINITION 4 (UC models) A UC model is a triple $M = \langle \{D_a | \ a \in \Theta\}, <_\tau, [\![\cdot]\!] \rangle$ such that: (i) $\{D_a | \ a \in \Theta\}$ is a UC frame, (ii) D_τ is the set of non-empty convex sets of integers and $\forall [\mathrm{t}, \mathrm{t}' \in D_\tau\text{: } \mathrm{t} <_\tau \mathrm{t}'$ iff $\forall [n \in \mathrm{t} \forall n' \in \mathrm{t}'(n < n')$, and (iii) $[\![\cdot]\!]$ assigns to each $A \in Con_a$ a value $[\![A]\!] \in D_a$ and to each $B \in \{\text{CON, BEG, END, CTR, BCK}, \vartheta\}$, a value $[\![B]\!]$ such that:

a. $[\![\text{CON}]\!] \in D_{\varepsilon\sigma}$ $\quad$ $[\![\vartheta]\!] \in \{f_\varepsilon \cup f_\sigma | \ f_\varepsilon \in D_{\omega\varepsilon\tau} \ \& \ f_\sigma \in D_{\omega\sigma\tau}\}$
$[\![\text{BEG}]\!], [\![\text{END}]\!] \in D_{\sigma\varepsilon}$ $\quad$ $[\![\text{CTR}]\!], [\![\text{BCK}]\!] \in \{f_\varepsilon \cup f_\sigma | \ f_\varepsilon \in D_{\varepsilon\delta} \ \& \ f_\sigma \in D_{\sigma\delta}\}$

b. $\forall [\mathrm{t} \in D_\tau, \mathrm{w} \in D_\omega, \mathrm{d} \in D_\delta, \mathrm{e} \in D_\varepsilon, \mathrm{s} \in D_\sigma, \mathrm{ev} \in D_\varepsilon \cup D_\sigma$:
$[\![\vartheta]\!](\mathrm{w}, \mathrm{e}) = \mathrm{t} \rightarrow \exists n(\mathrm{t} = \{n\} \ \& \ [\![\vartheta]\!](\mathrm{w}, [\![\text{BEG}]\!]([\![\text{CON}]\!](\mathrm{e}))) = \{(n+1)\})$
$[\![\vartheta]\!](\mathrm{w}, \mathrm{s}) = \mathrm{t} \rightarrow \{\text{MIN } \mathrm{t}\} = [\![\vartheta]\!](\mathrm{w}, [\![\text{BEG}]\!](\mathrm{s})) <_\tau \{\text{MAX } \mathrm{t}\} = [\![\vartheta]\!](\mathrm{w}, [\![\text{END}]\!](\mathrm{s}))$
$\langle \mathrm{ev}, \mathrm{d}, \ldots \rangle \in {}^{\{\}}[\![A]\!](\mathrm{w}) \rightarrow \mathrm{d} = [\![\text{CTR}]\!](\mathrm{ev})$ $\quad$ if $A \in Con_{\omega a\delta\ldots t}$, $a \in \{\varepsilon, \sigma\}$
$\mathrm{d} = [\![\text{CTR}]\!](\mathrm{ev}) \leftrightarrow \mathrm{d} = [\![\text{CTR}]\!]([\![B]\!](\mathrm{ev}))$ $\quad$ if $B \in \{\text{CON, BEG, END}\}$
$\mathrm{d} = [\![\text{BCK}]\!](\mathrm{ev}) \rightarrow [\![\text{CTR}]\!](\mathrm{ev}) \in D_\delta \backslash \{\mathrm{d}\}$

The syntactic and semantic definitions of UC include three extra rules (x–xii), which introduce and interpret time-related logical constants.

DEFINITION 5 (UC syntax). Rules (i–ix) as in DEFINITION 5_ω
x. $(A \subset B), (A < B) \in Term_t$, if $A, B \in Term_\tau$
xi. $\text{CON}\, A \in Term_\sigma$, if $A \in Term_\varepsilon$
$\text{BEG}\, A, \text{END}\, A \in Term_\varepsilon$, if $A \in Term_\sigma$
$\text{CTR}\, A, \text{BCK}\, A \in Term_\delta$, if $A \in Term_\varepsilon \cup Term_\sigma$
xii. $\vartheta_W A \in Term_\tau$, if $W \in Term_\omega$ and $A \in Term_\varepsilon \cup Term_\sigma$

DEFINITION 6 (UC semantics). Rules (i–ix) as in DEFINITION 6_ω
x. $[\![A \subset B]\!]^g = 1$ $\quad$ iff $[\![A]\!]^g, [\![B]\!]^g \in D_\tau \ \& \ [\![A]\!]^g \subset [\![B]\!]^g$
$[\![A < B]\!]^g = 1$ $\quad$ iff $[\![A]\!]^g, [\![B]\!]^g \in D_\tau \ \& \ [\![A]\!]^g <_\tau [\![B]\!]^g$
xi. $[\![BA]\!]^g \doteq [\![B]\!]([\![A]\!]^g)$ $\quad$ if $B \in \{\text{CON, BEG, END, CTR, BCK}\}$
xii. $[\![\vartheta_W A]\!]^g \doteq [\![\vartheta]\!]([\![W]\!]^g)([\![A]\!]^g)$

In UC an (*utterance*) *context* is a pair of a non-empty common ground, p_0, and a speech event, e_0, realized throughout p_0 at a particular instant. A context induces a *default state* ('commonplace effect' of Stalnaker 1978): the common ground p_0 determines the default modal topics, whereas the speech event e_0 determines the default temporal topics. The modal defaults are the same as in UC_ω. In the temporal domain, the speech instant is the default topic time, and the speech event itself, the default perspective point (e.g. for indexicals, adapting Kaplan 1978). The truth definition for UC is the same as for UC_ω (i.e. D8).

DEFINITION 7 (utterance context, default state). For a model $M = \langle \{D_a | \ a \in \Theta\}, <_\tau, [\![\cdot]\!] \rangle$,
i. an *M*-(*utterance*) *context* is a pair $\langle \mathrm{p}_0, \mathrm{e}_0 \rangle \in D_{\omega t} \times D_\varepsilon$ such that (a) ${}^{\{\}}\mathrm{p}_0 \neq \varnothing$, and
(b) $\exists \mathrm{t}_0 \forall \mathrm{w} \in {}^{\{\}}\mathrm{p}_0\text{: } \mathrm{t}_0 = [\![\vartheta]\!](\mathrm{w}, \mathrm{e}_0) \ \& \ \langle \mathrm{e}_0, [\![\text{CTR}]\!](\mathrm{e}_0) \rangle \in {}^{\{\}}[\![speak]\!](\mathrm{w})$
ii. ${}^{st}\langle \mathrm{p}_0, \mathrm{e}_0 \rangle = {}^{\chi}\{\langle \langle \mathrm{t}_0, \mathrm{w}, \mathrm{p}_0, \mathrm{e}_0 \rangle, \langle \ \rangle \rangle | \ \mathrm{w} \in {}^{\{\}}\mathrm{p}_0 \ \& \ \mathrm{t}_0 = [\![\upsilon]\!]\square(\mathrm{w}, \mathrm{e}_0)\}$

In the following analysis of Kalaallisut discourse, we systematically first use UC_ω to analyze modal reference and then the full UC, to factor in temporal reference. We begin with fact-oriented moods (section 3) and successively add attitudes (section 4), hypothetical mood (section 5), modal remoteness (section 6), and direct composition (section 7).

3. Fact-oriented moods

3.1. Observations

Kalaallisut verbs inflect for *matrix mood* (22) or *dependent mood* (23). Matrix moods are illocutionary. A matrix 'verb' is a complete sentence, classified by the mood inflection as an assertion about the topic (declarative, DEC), question about the topic (interrogative, QUE), wish concerning the topic (optative, OPT), or directive to the addressee (imperative, IMP). Dependent moods classify the dependent verb, in relation to the matrix, as a background *fact* (FCT), *hypothesis* (HYP), *elaboration* (ELA), or *habit* (HAB). They also mark the centering status of the dependent subject as either *topical* (e.g. -FCT$_{T}$) or *backgrounded* (e.g. -FCT$_{\perp}$), i.e., anaphoric or in contrast to the matrix subject, which is always topical.

(22) Matrix moods

a. (**Aqagu*) *uterpoq.*
(**aqagu*) *utir-**pu**-q*
(*tomorrow) return-DEC$_{T}$-3S
'He$_{T}$ has returned (*tomorrow).'

b. (**Aqagu*) *uterpa*?
(**aqagu*) *utir-**pi**-a*
(*tomorrow) return-QUE-3S
'Has he$_{T}$ returned (*tomorrow)?'

c. (*Aqagu*) *uterli*!
(*aqagu*) *utir-**li***
(tomorrow) return-OPT.3S
'May he$_{T}$ return (tomorrow)!'

d. (*Aqagu*) *uterina*!
(*aqagu*) *utir-**gi**-na*
(tomorrow) return-IMP-2S
'Return (tomorrow)!'

(23) Dependent moods (sample)

a. (**Aqagu*) {*uterami* | *utermat*} *nuannaarpuq.*
(**aqagu*) {*utir-**ga**-ni* | *utir-**mm**-at*} *nuannaar-pu-q*
(*tomorrow) {return-FCT$_{T}$-3S$_{T}$| return-FCT$_{\perp}$-3S$_{\perp}$} happy-DEC$_{T}$-3S
'Because/when {he$_{T}$ | he$_{\perp}$} returned (*tomorrow), he$_{T}$ was happy.'

b. *Aqagu* {*uteruni* | *uterpat*} *nuannaassaaq.*
aqagu {*utir-**gu**-ni* | *utir-**pp**-at*} *nuannaar-ssa-pu-q*
tomorrow {return-HYP$_{T}$-3S$_{T}$| return-HYP$_{\perp}$-3S$_{\perp}$} happy-exp$^{>}$-DEC$_{T}$-3S
'If/when {he$_{T}$ | he$_{\perp}$} returns tomorrow, he$_{T}$'ll be happy. (*lit.* is expected to)'

c. *Oqarpoq* {*uternerarluni* | *utertoq*}.
uqar-pu-q {*utir-nirar-**llu**-ni* | *utir-**tu**-q*}
say-DEC$_{T}$-3S {return-say$_{se}$-ELA$_{T}$-3S$_{T}$ | return-ELA$_{\perp}$-3S$_{\perp}$}
'He$_{T}$ has said that {he$_{T}$ | he$_{\perp}$} has returned.'

Most Kalaallisut moods are either *fact-oriented* (DEC, QUE, FCT) or *prospect-oriented* (OPT, IMP, HYP). As (22)–(23) illustrate, prospect-oriented moods introduce future eventualities and allow future location times, whereas fact-oriented moods rule out future location times. Discourse-initially, fact-oriented moods require the *state-equivalent* (i.e. the state itself or the consequent state of an event) to hold at the speech instant (24a, b). If the topic time is not an instant but a period, then fact-oriented moods require the *event-equivalent* (i.e. the event itself or the beginning of a state) to fall within that period (see (25)–(26)). In addition, at any point in discourse, fact-oriented moods constrain the event-equivalent of the last eventuality of the verbal base to be a *currently verifiable fact* from the perspective of the speech act, i.e. to precede the speech act in the speech world. Note that in (23b), the last eventuality of the base is the state of expectation introduced by the attitudinal suffix *-ssa* ‘exp$^{>}$’, not the future eventuality introduced by the root (see also Bittner 2005, 2008).

(24) a. *Ulapippunga.*
*ulapik-***pu***-nga*
busy-DEC$_{T}$-1S
‘I am busy.’
b. *Uterpunga.*
*utir-***pu***-nga*
return-DEC$_{T}$-1S
‘I have returned.’

(25) a. *Ullumi ulapippunga.*
*ullumi ulapik-***pu***-nga*
today busy-DEC$_{T}$-1S
‘I’ve been busy today. (NOT: I am busy (later) today.)’
b. *Ullumi uterpunga.*
*Ullumi utir-***pu***-nga.*
today return-DEC$_{T}$-1S
‘I returned today. (NOT: I return today.)’

(26) *Ole nuannarpoq Aani ullumi utermat.*
*Ole nuannaar-pu-q Aani ullumi utir-***mm***-at.*
Ole happy-DEC$_{T}$-3S Ann today return-FCT$_{\perp}$-3S$_{\perp}$
‘Ole is happy because Ann returned today. (NOT: …because Ann returns today.)’

DEFINITION (currently verifiable fact). From the perspective of an event e_0, an event e is a *currently verifiable fact* iff e occurred in the same world as e_0 prior to e_0.

OBSERVATION 1. *Fact-oriented moods* constrain the event-equivalent of the last eventuality of the verbal base to be a currently verifiable fact from the perspective of the speech event.

The current verifiability requirement of Kalaallisut fact-oriented moods makes them unlike the English indicative mood. For example, in contrast to the ungrammatical Kalaallisut declarative (22a), the English non-past indicative can refer to the future, e.g. in *I* ***return*** *tomorrow*. The English past indicative can refer to what is possible rather than what is, e.g. in *If Oswald didn’t kill Kennedy, someone else* ***killed*** *him*. In contrast, the Kalaallisut declarative (27) is ungrammatical: a hypothetical murder is not a currently verifiable fact. All that can be verified now is a state of expectation or belief (recall *-ssa* ‘-exp$^{>}$’ in (2)).

(27) * *Oswaldip Kennedy toqusimanngippagu*
Oswald-p Kennedy tuqut-sima-nngit-pp-a-gu
Oswald-ERG Kennedy kill-prf-not-HYP$_{\perp}$-3S$_{\perp}$-3S
inupiloqataata toqusimavaa.
*inuk-piluk-qat-ata tuqut-sima-***pa***-a*
man-bad-other-3S$_{\perp}$.ERG kill-prf-DEC$_{T\perp}$-3S.3S
‘(NOT: If Oswald didn’t kill Kennedy, then someone else killed him.)’

While ruling out future reference, fact-oriented moods allow negation. Kalaallisut expresses negation by means of a derivational suffix *-nngit* ‘not’. The derivational status of this suffix is shown by the fact that it allows further derivation (e.g. in (28iii)). The negation *-nngit* also allows state-modifiers (e.g. ‘long-MOD’, ‘still’), which show that it introduces a state (like the root ‘asleep-’). Finally, compatibility with fact-oriented moods (i) and their elaborations (ii) shows that negative states can be currently verifiable facts.

(28) i. *Ullumi* *sivisuumik* {*makinngila-* | *sinippu-* | **makippu-*}*-nga.*
ullumi *sivisuuq-mik* {*makik-**nngit**-la-* | *sinik-pu-* | **makik-pu-*}*-nga.*
today long-MOD {get.up-not-DEC- | asleep-DEC$_{\mathrm{T}}$- | *get.up-DEC$_{\mathrm{T}}$}-1S
'Today I$^{\mathrm{T}}$ {stayed in bed | slept | *got up} a long time.'

ii. *Suli* {*makinngit-* | *sinit-* |**makit*}*-tunga* *Ole* *iserpoq.*
suli {*makik-**nngit**-* | *sinik-* | **makik-*}*-tu-nga* *Ole* *isir-pu-q*
still {get.up-not- | asleep- | *get.up-}-ELA$_{\perp}$-1S Ole enter-DEC$_{\mathrm{T}}$-3S
'While I$_{\perp}$ was still {in bed | asleep | *…} Ole$^{\mathrm{T}}$ dropped in.'

iii. *Nuliani* *aamma* *suli* {*makinngin-* | *sinin-* | **makin-*}*-nerarpaa.*
nulia-ni *aamma* *suli* {*makik-**nngit**-* | *sinik-* | **makik*}*-nirar-pa-a*
wife-3S$_{\mathrm{T}}$ also still {get.up-not-| asleep- | *get.up-}-say$_{\perp}$-DEC$_{\mathrm{T}\perp}$-3S.3S
'He$_{\mathrm{T}}$ said that his$_{\mathrm{T}}$ wife too was still {in bed | asleep | *…}.'

I propose that the current verifiability constraint of fact-oriented moods has two components: modal and temporal. Modally, the matrix declarative mood (DEC) locates the matrix eventuality throughout the output common ground (main fact), whereas the dependent factual mood (FCT) locates the subordinate eventuality throughout a superset of the common ground (background fact). Thus, both eventualities are realized in every live candidate for the speech world, so they can be verified in that world. Temporally, the declarative matrix mood locates the matrix *event-equivalent* (EVT) before the speech act. That is, from the perspective of the speech act this event is a currently verifiable fact. The dependent factual mood locates the matrix EVT within the consequent state of the subordinate EVT. Thus, the subordinate EVT is verifiable from the matrix EVT, whose temporal location within the consequent state further suggests a causal link. It does not entail it because *post hoc* is not necessarily *propter hoc.* But whether or not the (real) subordinate EVT caused the (real) matrix EVT, neither EVT can be located in the future of the speech act.

To make this proposal precise, I first formalize the modal notion of a *verifiable fact* (section 3.2) and then the temporal modifier *currently* (section 3.3).

3.2. Verifiable facts

The Kalaallisut discourse (29i, ii) illustrates typical use of fact-oriented moods (DEC, FCT) and their interaction with negation (*-nngit* 'not'). The proposed representation of this discourse in UC$_{\omega}$ is given in (30i, ii).

(29) i. *Ole* *iserpoq.*
Ole *isir-**pu**-q*
Ole enter-DEC$_{\mathrm{T}}$-3S
'Ole$^{\mathrm{T}}$ has dropped in.'

ii. *Nuannaanngilaq* *nuliani* *naparsimammat.*
*nuannaar-nngit-**la**-q* *nulia-ni* *naparsima-**mm**-at*
happy-not-DEC-3S wife-3S$_{\mathrm{T}}$ ill-FCT$_{\perp}$-3S$_{\perp}$
'He$_{\mathrm{T}}$'s not happy, because his$_{\mathrm{T}}$ wife$^{\mathrm{T}}$ is ill.'

(30) i. $^{\mathrm{T}}[x|\ x =_i ole];\ [enter_{\top\omega}\langle\top\delta\rangle];\ {}^{\mathrm{T}}[p|\ p = \top\omega||]$

ii. $[w|\ happy_w\langle\top\delta\rangle];\ [\top\omega \notin \perp\omega||];\ {}^{\mathrm{T}}[p|\ p = \top\omega||];\ [x\ w|\ wife_w\langle x, \top\delta\rangle];\ [ill_{\perp\omega}\langle\perp\delta\rangle];$
$[\top\omega|| \subseteq \perp\omega||]$

In (30i), the first box adds Ole to the $\top$-list, while the next two boxes comment on this topic. The verbal root adds the information that the topic (Ole) entered in the local topic world ($\top\omega$). This reduces the common ground ($\top\omega||$) to the worlds where this is the case. The declarative mood introduces the updated common ground as the new primary topic. This is the new topical proposition and the truth-set of the declarative sentence (29i).

In (30ii) the first three boxes represent the negated declarative matrix of (29ii) ('happy-not-DEC-3S'). The scope of negation adds to the $\perp$-list all the worlds where the topical individual (Ole) is happy. The negation asserts that the world of evaluation is not in this set ($\perp\omega||$). The declarative mood identifies the world of evaluation as the topical speech world ($\top\omega$), and introduces the set of surviving topic worlds ($\top\omega||$) as the new primary topic. That is, in the context of (29i), the truth-set of the negated declarative matrix of (29ii) is the set of worlds (where this speech act takes place and) where Ole has entered unhappy.

The post-posed factual dependent (FCT) introduces a background fact that may have caused this matrix fact. In (30ii) the factual dependent is represented by the last three boxes. The entire sequence introduces into the background the proposition that Ole has a sick wife ($\perp\omega||$). The factual mood adds that this background proposition is a fact (i.e. true) throughout the matrix common ground ($\top\omega||$). This suggests that it may be a cause of the matrix fact (i.e. that Ole has entered unhappy in the world of the current speech act).

This suggestion is reinforced by temporal anaphora, which locates the beginning of Ole's unhappy state within the consequent state of the beginning of his wife's illness. This temporal relation is discussed in the next section, which explicates *current* verifiability.

3.3. Current verifiability

In what follows, e is a variable of type ε (event), s of type σ (state), and t of type τ (time). Time-related DRT-notation is defined in Table 2.

Table 2. DRT-abbreviations for time-related UC-terms

- static relations and operations

$t \subseteq t'$ for $t \subset t' \vee t = t'$

$t \leq t'$ for $t < t' \vee t = t'$

$\text{EVT}\ e$ for e

$\text{EVT}\ s$ for $\text{BEG}\ s$

$\text{STA}\ s$ for s

$\text{STA}\ e$ for $\text{CON}\ e$

- related DRT-abbreviations ($a \in \text{DR}(\Theta)$, $\mathbf{R} \in \{=, \subseteq, \subset, \leq, <\}$)

$B_{ab}\, A_{sa}$ for $\lambda i_s.\ B\, Ai$

$(A\ \mathbf{R}_W\ B)$ for $\lambda i_s.\ \vartheta_{W^\circ i}\, A^\circ i\ \mathbf{R}\ \vartheta_{W^\circ i}\, B^\circ i$

$[\text{AT}_W\{A, T\}]$ for $\lambda I_{st}\lambda j_s.\ Ij \wedge (\exists i_s(Ii \wedge \vartheta_{Wj}\ \text{EVT}\ Ai \subset Ti) \rightarrow \vartheta_{Wj}\ \text{EVT}\ Aj \subset Tj)$

$\wedge (\neg\exists i_s(Ii \wedge \vartheta_{Wj}\ \text{EVT}\ Ai \subset Ti) \rightarrow Tj \subset \vartheta_{Wj}\ \text{STA}\ Aj)$

The *global* AT-*update*, $[\mathrm{AT}_W\{A, T\}]$, provides a unified representation for the two temporal patterns found with fact-oriented moods in Kalaallisut. Recall that by discourse-initial default, a currently verifiable state holds now (31a), whereas a currently verifiable event has a consequent state that holds now (31b). Other topic times can be set, if the current verifiability requirement of the fact-oriented mood can be met (32a, b).

(31) a. *Ulapik-**pu**-nga.*
busy-DEC$_{\mathrm{T}}$-1S
'I am busy.'

b. *Utir-**pu**-nga*
return-DEC$_{\mathrm{T}}$-1S
'I have returned.'

(32) a. {*Ullumi* | **aqagu*} *ulapik-**pu**-nga.*
{today | *tomorrow} busy-DEC$_{\mathrm{T}}$-1S
'I've been busy {today | *tomorrow}.'
b. {*Ullumi* | **aqagu*} *utir-**pu**-nga.*
{today | *tomorrow} return-DEC$_{\mathrm{T}}$-1S
'I returned {today | *tomorrow}.'

I propose to represent the default pattern (31a, b) as in (33a, b). These UC representations are interpreted relative to the default state, where the topic time $(\top\tau)$ is the speech instant. Since an instant (unit set) cannot properly include anything, the global AT-updates reduce to (34a, b).

(33) a. $[s|\ busy_{\top\omega}\langle s, \mathrm{CTR}\ \top\varepsilon\rangle];\ [\mathrm{AT}_{\top\omega}\{\bot\sigma, \top\tau\}];\ [\mathrm{EVT}\ \bot\sigma <_{\top\omega} \top\varepsilon];\ {}^{\top}[p|\ p = \top\omega||]$
b. $[e|\ return_{\top\omega}\langle e, \mathrm{CTR}\ \top\varepsilon\rangle];\ [\mathrm{AT}_{\top\omega}\{\bot\varepsilon, \top\tau\}];\ [\mathrm{EVT}\ \bot\varepsilon <_{\top\omega} \top\varepsilon];\ {}^{\top}[p|\ p = \top\omega||]$

(34) a. $[s|\ busy_{\top\omega}\langle s, \mathrm{CTR}\ \top\varepsilon\rangle,\ \top\tau \subset_i \vartheta_{\top\omega}\ s,\ \mathrm{BEG}\ s <_{\top\omega} \top\varepsilon];\ {}^{\top}[p|\ p = \top\omega||]$
b. $[e|\ return_{\top\omega}\langle e, \mathrm{CTR}\ \top\varepsilon\rangle,\ \top\tau \subset_i \vartheta_{\top\omega}\ \mathrm{CON}\ e,\ e <_{\top\omega} \top\varepsilon];\ {}^{\top}[p|\ p = \top\omega||]$

That is, what holds at the topical instant is the state-equivalent of the verbal eventuality (STA, i.e. the state itself in (34a), consequent state in (34b)). In addition, declarative mood requires current verifiability from the perspective of the speech act. To pass this test, the event-equivalent (EVT, i.e. the beginning of the state in (34a), the event itself in (34b)) must have already happened in the speech world $(\top\omega)$ prior to this speech act $(\top\varepsilon)$.

In (32a, b), the temporal noun can be interpreted as a *topic-setting* sentence-modifier (e.g. 'today-$^{\mathrm{T}}$') or *bottom-elaborating* eventuality-modifier (e.g. 'today-$_{\varepsilon}$'). I formalize this idea by means of two special sequencing operators, *topic-comment* ($^{\mathrm{T}}$;) and *bottom-elaboration* ($^{\bot}$;), defined below. A topic-comment sequence (A^{T}; B) reduces to (A; B), iff A (*topic-update*) adds at least one object to the input $\top$-list and the top $\top$-object in the output of A is referred to in B (*comment*) by $\top a_1$, for some type a, and maintains its $\top a_1$-rank throughout B (i.e. B can add other types of topics, but not any a-topics.) Otherwise, the output of (A^{T}; B) is the absurd state, $\bot$. (We write $\mathrm{y} \prec \mathrm{z}$ for $\mathrm{z} = (\mathrm{z}_1, \ldots, \mathrm{z}_m, \mathrm{y}_1, \ldots, \mathrm{y}_n\rangle$, where $\mathrm{y} \in D^n$, $\mathrm{z} \in D^{m+n}$, and $m \geq 1$. '$X[Y/Z]$' stands for the result of replacing every Y in X with Z.) A background-elaboration sequence ($A^{\bot}$; B) is defined analogously for $\bot$-lists.

$$\text{today-}^{\mathrm{T}} \quad \vdash \quad \mathrm{s/s}\colon \lambda K_{[]}({}^{\mathrm{T}}[t|\ t \subseteq_i day.of\langle \vartheta_{\top\omega} \top\varepsilon\rangle]^{\mathrm{T}}; K) \qquad [\,] := (st)st$$

$$\text{today-}_{\eta} \quad \vdash \quad \underline{\mathrm{s}}/\underline{\mathrm{s}}\colon \lambda \underline{V}_{[s\omega]} \lambda \underline{w}_{s\omega}(\underline{V}\ \underline{w}^{\bot};\ [\vartheta_{\underline{w}}\ \bot\eta \subseteq_i day.of\langle \vartheta_{\top\omega} \top\varepsilon\rangle]) \qquad \eta \in \{\varepsilon, \sigma\},\ [a] := a[\,]$$

$$({}^{\mathrm{T}};) \quad \mathrm{c}[\![A^{\mathrm{T}}; B]\!]^g \ = \ \{\mathrm{h} \in \mathrm{c}[\![A; B]\!]^g|\ \exists a \forall \mathrm{k} \in \mathrm{c}[\![A; B]\!]^g\ \exists \mathrm{j} \in \mathrm{c}[\![A]\!]^g \exists \mathrm{i} \in \mathrm{c}\colon \top\mathrm{i} \prec \top\mathrm{j} \preccurlyeq \top\mathrm{k}$$

$$\&\ (\top\mathrm{j})_1 = ((\top\mathrm{k})_a)_1\ \&\ [\![B]\!]^g \neq [\![B[\top a_1/\bot a_1]\,]\!]^g\}$$

$$(^{\perp};)\quad c[\![A^{\perp}; B]\!]^{g} \;=\; \{h \in c[\![A; B]\!]^{g} \mid \exists a \forall k \in c[\![A; B]\!]^{g}\ \exists j \in c[\![A]\!]^{g} \exists i \in c\colon \perp i \prec \perp j \preccurlyeq \perp k \;\&\; (\perp j)_1 = ((\perp k)_a)_1 \;\&\; [\![B]\!]^{g} \neq [\![B[\perp a_1/\top a_1]\,]\!]^{g}\}$$

If the temporal noun in (32a, b) is interpreted as ‘today-$^{\mathrm{T}}$’, we get the default-override reading (35a, b). The temporal noun updates the topic time ($\top\tau$) to part of the speech day. Since this can properly include an event, the global AT-update includes within this topical period the event-equivalent, i.e. the beginning of the state in (35a) and the event itself in (35b). Both events must be currently verifiable, i.e. must have already happened in the speech world ($\top\omega$) before the speech act ($\top\varepsilon$). This rules out future topic times. If the temporal noun is read as ‘today-$_{\varepsilon}$’, then it elaborates the verbal base, as in (36a, b). In this case, the topic time is still the speech instant, so we get a temporally elaborated variant of the default pattern (34a, b). For non-future location times this variant is coherent. Future location times are still ruled out because future eventualities fail the current verifiability test.

(35)a. ${}^{\mathrm{T}}[t|\ t \subseteq_i day.of\langle \vartheta_{\mathrm{T}\omega} \top\varepsilon\rangle]^{\mathrm{T}}; ([s|\ busy_{\mathrm{T}\omega}\langle s, \textsc{ctr}\ \top\varepsilon\rangle, \vartheta_{\mathrm{T}\omega}\ \mathrm{BEG}\ s \subset_i \top\tau, \textsc{beg}\ s <_{\mathrm{T}\omega}$
$\top\varepsilon]; {}^{\mathrm{T}}[p|\ p = \top\omega||])$
b. ${}^{\mathrm{T}}[t|\ t \subseteq_i day.of\langle \vartheta_{\mathrm{T}\omega} \top\varepsilon\rangle]^{\mathrm{T}}; ([e|\ return_{\mathrm{T}\omega}\langle e, \textsc{ctr}\ \top\varepsilon\rangle, \vartheta_{\mathrm{T}\omega}\ e \subset_i \top\tau, e <_{\mathrm{T}\omega} \top\varepsilon];$
${}^{\mathrm{T}}[p|\ p = \top\omega||])$

(36)a. $[s|\ busy_{\mathrm{T}\omega}\langle s, \textsc{ctr}\ \top\varepsilon\rangle, \vartheta_{\mathrm{T}\omega}\ s \subseteq day.of\langle \vartheta_{\mathrm{T}\omega} \top\varepsilon\rangle, \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ s, \mathrm{BEG}\ s <_{\mathrm{T}\omega} \top\varepsilon];$
${}^{\mathrm{T}}[p|\ p = \top\omega||]$
b. $[e|\ return_{\mathrm{T}\omega}\langle e, \textsc{ctr}\ \top\varepsilon\rangle, \vartheta_{\mathrm{T}\omega}\ e \subseteq day.of\langle \vartheta_{\mathrm{T}\omega} \top\varepsilon\rangle, \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \mathrm{CON}\ e, e <_{\mathrm{T}\omega} \top\varepsilon];$
${}^{\mathrm{T}}[p|\ p = \top\omega||]$

For the two-sentence discourse (29i, ii), temporal reference is explicated in (37i, ii). The declarative verbs in (37i, ii) instantiate the default pattern (31a, b) for events (‘enter-’) and states (‘-not’). In (37ii) the dependent factual mood locates the matrix event (beginning of Ole’s unhappy state) within the consequent state of the subordinate event (beginning of his wife’s illness) throughout the matrix common ground ($\top\omega||$). This suggests, but does not entail, that the subordinate fact may have caused the matrix fact.

(37i) (29i) Ole-$^{\mathrm{T}}$ has dropped in.
Ole-$^{\mathrm{T}}$ enter-DEC$_{\mathrm{T}}$-3S
${}^{\mathrm{T}}[x|\ x =_i ole]^{\mathrm{T}}; ([e|\ enter_{\mathrm{T}\omega}\langle e, \top\delta\rangle, \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \mathrm{CON}\ e, e <_{\mathrm{T}\omega} \top\varepsilon]; {}^{\mathrm{T}}[p|\ p = \top\omega||])$

(37ii) (29ii) He$_{\mathrm{T}}$’s not happy because his$_{\mathrm{T}}$ wife is ill.
happy-not-DEC$_{\mathrm{T}}$-3s wife-3s$_{\mathrm{T}}$ ill-FCT$_{\perp}$-3s$_{\perp}$
$[s\ w|\ happy_w\langle s, \top\delta\rangle, \top\tau \subset_i \vartheta_w\ s]; [\top\omega \notin \perp\omega||]; [s|\ \textsc{ctr}\ s =_i \top\delta, \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ s,$
$\mathrm{BEG}\ s <_{\mathrm{T}\omega} \top\varepsilon]; {}^{\mathrm{T}}[p|\ p = \top\omega||]; ([t|\ t =_i \vartheta_{\mathrm{T}\omega}\ \mathrm{BEG} \perp\sigma]; [x\ w|\ wife_w\langle x, \top\delta, \top\tau\rangle];$
$[s|\ ill_{\perp\omega}\langle s, \perp\delta\rangle, \perp\tau \subset_i \vartheta_{\perp\omega}\ \mathrm{CON\ BEG}\ s]; [\top\omega|| \subseteq \perp\omega||])$

To summarize the analysis so far: fact-oriented moods assert that the verbal event-equivalent (EVT) is a currently verifiable fact. Modally, the declarative mood (DEC) locates the matrix event throughout the output common ground (main fact), whereas the factual mood (FCT) locates the subordinate event throughout a superset of this modality (background fact). Both events are thus realized in every live candidate for the speech world and so are *verifiable* in that world. Temporally, the declarative mood locates the matrix event before the speech act. So, from the perspective of the speech act the matrix event is a *currently* verifiable fact. The factual mood locates the matrix event within the consequent state of the subordinate event. The subordinate event is thus verifiable from the matrix event and hence from the speech act. The location within the consequent state further suggests that the (real) matrix event may have been caused by the (real) subordinate event. Whether or not there is such a causal link, neither event can be located in the future of the speech act.

We now turn to a special case of fact-oriented discourse—to wit, discourses that introduce currently verifiable attitudinal states.

4. Attitude reports

4.1. Observations

In English, indirect report verbs with non-finite complements are temporally *de se* in the sense of Lewis (1979). That is, the complement situation is located in time relative to the attitude-holder's now. In Kalaallisut, closest equivalents are derivational *attitude* (*att*) suffixes. Temporal anaphora shows that *att*-suffixes introduce attitude states (38a, c) or speech events (38b, d). The attitude or speech can be fact-oriented (38a, b) or prospect-oriented (38c, d). For fact-oriented *att*-suffixes, the *att*-event functions as the perspective point for locating the base-eventuality, just like the speech event does when the same verbal base is inflected for fact-oriented mood. In either case, future location times are ruled out, as fact-oriented *att*-suffixes in (38a, b) and fact-oriented moods (e.g. DEC and FCT in (25)–(26)) attest. In contrast, prospect-oriented *att*-suffixes (38c, d) and prospect-oriented moods (e.g. OPT and IMP) allow future location times.

(38) ***Att***-suffixes (sample)
a. *Ernini* (**aqagu*) *ajugaasoraa.*
irni-ni (**aqagu*) *ajugaa-**suri**-pa-a*
son-3s$_{\mathrm{T}}$ (*tomorrow) win-bel$_{\perp}$-DEC$_{\mathrm{T}\perp}$-3s.3s
'He$_{\mathrm{T}}$ believes his$_{\mathrm{T}}$ son to have won (*tomorrow).'
b. *Ernini* (**aqagu*) *ajugaanerarpaa.*
irni-ni (**aqagu*) *ajugaa-**nirar**-pa-a*
son-3s$_{\mathrm{T}}$ (*tomorrow) win-say$_{\perp}$-DEC$_{\mathrm{T}\perp}$-3s.3s
'He$_{\mathrm{T}}$ has said his$_{\mathrm{T}}$ son has won (*tomorrow).'
c. (*Aqagu*) *iser-*{*-niar* | *-ssa* | *-qina*}*-poq.*
(*aqagu*) *isir-*{***-niar*** | ***-ssa*** | ***-qina***}*-pu-q*
(tomorrow) enter-{-int$_{se}^{>}$ | -exp$^{>}$ | -dread$^{>}$}-DEC$_{\mathrm{T}}$-3s
'He$_{\mathrm{T}}$ {intends | is expected | is liable} to drop in (tomorrow).'
d. *Ikinngunni* (*aqagu*) *iseqquaa.*
ikinngut-ni (*aqagu*) *isir-**qqu**-pa-a.*
friend-3s$_{\mathrm{T}}$ (tomorrow) enter-bid$_{\perp}^{>}$- DEC$_{\mathrm{T}\perp}$-3s.3s
'He$_{\mathrm{T}}$ has invited his$_{\mathrm{T}}$ friend to drop in (tomorrow).'

Kalaallisut also has attitudinal roots. Lexically, these are unspecified as either fact- or prospect-oriented. However, they can be syntactically specified by a compatible *att*-suffix in the topic-elaborating mood, as (39) illustrates.

(39) Attitudinal roots elaborated by ***att***-suffixes

a. *Ole neriuppoq ajugaassalluni.*
*Ole niriuk-pu-q ajugaa-**ssa**-llu-ni.*
Ole hope-DEC$_{\mathrm{T}}$-3S win-des$^{>}$-ELA$_{\mathrm{T}}$-3S$_{\mathrm{T}}$
'Ole hopes to win.'

b. *Olep ikinngunni oqarfigaa iseqqullugu.*
*Ole-p ikinngut-ni uqar-vvigi-pa-a isir-**qqu**-llu-gu.*
Ole-ERG friend-3S$_{\mathrm{T}}$ say-to-DEC$_{\mathrm{T}\perp}$-3S.3S enter-bid$^{>}{}_{\perp}$-ELA$_{\mathrm{T}}$-3S$_{\perp}$
'Ole$^{\mathrm{T}}$ has invited his$_{\mathrm{T}}$ friend to drop in.'

c. *Ole isumaqarpoq ernini ajugaasoralugu.*
*Ole isuma-qar-pu-q irni-ni ajugaa-**suri**-llu-gu.*
Ole idea-have-DEC$_{\mathrm{T}}$-3S son-3S$_{\mathrm{T}}$ win-bel$_{\perp}$-ELA$_{\mathrm{T}}$-3S$_{\perp}$
'Ole$^{\mathrm{T}}$ believes his$_{\mathrm{T}}$ son to have won.'

d. *Olep oqarfigaanga ernini ajugaanerarlugu.*
*Ole-p uqar-vvigi-pa-a-nga irni-ni ajugaa-**nirar**-llu-gu.*
Ole-ERG say-to-DEC$_{\mathrm{T}\perp}$-3S-1S son-3S$_{\mathrm{T}}$ win-say$_{\perp}$-ELA$_{\mathrm{T}}$-3S$_{\perp}$
'Ole$^{\mathrm{T}}$ has told me that his$_{\mathrm{T}}$ son has won.'

We thus arrive at the following observation (see also Bittner 2005):

OBSERVATION 2. Derivational *att*-suffixes introduce:

i. fact-oriented attitudinal states (e.g. *-suri* 'bel$_{\perp}$', *-paluk* 'seem')
ii. fact-oriented speech events (e.g. *-nirar* 'say$_{\perp}$')
iii. prospect-oriented attitudinal states (e.g. *-ssa* 'exp$^{>}$|des$^{>}$', *-niar* 'int$_{se}^{>}$')
iv. prospect-oriented speech events (e.g. *-qqu* 'bid$_{\perp}^{>}$')

In section 2.1, we saw some cross-linguistic evidence that conditionals are modal topic-comment structures (see also Haiman 1978). In Kalaallisut, they are also a species of prospect-oriented attitude reports (recall (1)–(3)). Combining these two ideas, I propose that the antecedent introduces a topical modality, while the matrix comment expresses an attitude to this modality, $\top\Omega$. More precisely, an *att*-suffix introduces a prospect-oriented attitude state whose modal base is $\top\Omega$. In the $\top\Omega$-worlds that best fit the projections of the attitude holder, looking from a salient event e, the *att*-base event is realized within the consequent state of e and is a verifiable fact by the end of this attitude state. In contrast, fact-oriented *att*-suffixes are temporally and modally *de se*. The *att*-base event is realized before the attitude state and in the same modality. That is, according to the attitude holder, looking from the beginning of the attitudinal state, the *att*-base event is a currently verifiable fact.

4.2. Attitudes to own vs. topical modalities

Modally, fact- and prospect-oriented *att*-reports differ as follows. In fact-oriented *att*-reports the propositional object of the attitude is realized in the ideal worlds of the attitude holder's own modality. In contrast, in prospect-oriented *att*-reports the propositional object is realized in the ideal worlds of the topical modality.

To explicate this idea I propose to modify the standard modal theory of attitudes (Hintikka 1969). On this theory, *x believes p* is true in a world *w* iff every world where all of x's w-beliefs are true is a p-world. This wrongly predicts that x believes every proposition if x has conflicting beliefs in w (e.g. that all men are created equal and that a man has a right to own slaves). This type of problem is well known from conditionals and so is the solution—to wit, to quantify only over the best-fitting worlds (Lewis 1973, 1981, Kratzer 1981). Given a set of propositions Q, w is *Q-better* than v, written $v \angle_Q w$, iff every Q-proposition that holds in v also holds in w but not vice versa. The *ideal* of an ordered set $\langle p, \angle_Q\rangle$, written $\textsc{max}(p, Q)$, is the set of p-worlds that are not outranked by any Q-better p-world. In particular, worlds can be ranked by attitudes. Table 3 implements this idea in UC_ω and UC.

Table 3 DRT-abbreviations for attitude-related $\mathrm{UC}_{(\omega)}$-terms

i.	Attitudinal p-sets, induced orders and ideals ($att \in \{bel, exp, des, \ldots\}$)			
	$att_w\,x$	for	$\lambda p.\ att(w, x, p)$	UC_ω
	$att_w\,s$	for	$\lambda p.\ att(w, s, \textsc{ctr}\,s, p)$	UC
	$att_w\,e$	for	$\lambda p.\ \exists s(att(w, s, \textsc{ctr}\,e, p) \wedge \vartheta_w\,e \subset \vartheta_w\,s)$	UC
	$(Q\!: v \angle w)$	for	$\lambda p(p \in Q \wedge v \in p) \subset \lambda p(p \in Q \wedge w \in p)$	$\mathrm{UC}_{(\omega)}$
	$\textsc{max}(p, Q)$	for	$\lambda w.\ w \in p \wedge \neg\exists w'(w' \in p \wedge (Q\!: w \angle w'))$	$\mathrm{UC}_{(\omega)}$
ii.	Related DRT-abbreviations ($a \in \textsc{dr}(\Theta)$)			
	$B\|$	for	$\lambda I_{st}\lambda j_s.\ B\{I\}$	
	$B\|_{C1,\ldots Cn}$	for	$\lambda I_{st}\lambda j_s.\ B\{\lambda i_s(Ii \wedge C_1 i = C_1 j \wedge \ldots C_n i = C_n j)\}$	
	$[A_{sa} \in B_{(st)sat}]$	for	$\lambda I_{st}\lambda j_s.\ Ij \wedge Aj \in BIj$	
	$[A_{(st)sat} \subseteq B_{(st)sat}]$	for	$\lambda I_{st}\lambda j_s.\ Ij \wedge AIj \subseteq BIj$	
	$(att_W\,A\!: W_1 < W_2)$	for	$\lambda i.\ (att_{W^\circ i}\,A^\circ i\!: W_1{}^\circ i < W_2{}^\circ i)$	
	$\textsc{max}\langle B, att_W\,A\rangle$	for	$\lambda I_{st}\lambda j_s.\ \textsc{max}(B^\circ j, att_{W^\circ j}\,A^\circ j)$	
	$\textsc{max}\{B\|, att_W\,A\}$	for	$\lambda I_{st}\lambda j_s.\ \textsc{max}(B\{I\}, att_{W^\circ j}\,A^\circ j)$	

Sample entries for a fact-oriented *att*-suffix *-suri* 'bel$_\perp$', prospect-oriented *att*-suffix *-ssa* 'exp$^>$|des$^>$', and attitudinal root *niriuk-* 'hope', are given below. According to the attitude holder of '-bel$_\perp$', the *att*-base is a verifiable fact in those worlds of his own modality ($\underline{w}\|$) that best fit his ($\underline{w}$-)beliefs. This explicates modal *de se*. The unspecified attitude-holder (unspecified individual $?\delta$) of the prospect-oriented '-exp$^>$' projects that the *att*-base will become a verifiable fact in those worlds of the topical modality ($\top\Omega$) that best fit his ($\underline{w}$-)expectations. Finally, the root 'hope-' has a lexically unspecified modal base ($?\Omega$).

-bel$_\perp$ $\vdash$ $(\underline{s}\backslash pn)\backslash\underline{s}$: $\lambda\underline{V}_{[s\omega]}\lambda\underline{x}_{s\delta}\lambda\underline{w}_{s\omega}.\ \underline{V} \perp \omega;\ [\textsc{max}\{\underline{w}\|, bel_{\underline{w}}\,\underline{x}\} \subseteq \perp\omega\|_{\perp\delta}]$
-exp$^>$ $\vdash$ $\underline{s}\backslash\underline{s}$: $\lambda\underline{V}_{[s\omega]}\lambda\underline{w}_{s\omega}.\ \underline{V} \perp \omega;\ [\textsc{max}\langle\top\Omega, exp_{\underline{w}}\,?\delta\rangle \subseteq \perp\omega\|]$
hope- $\vdash$ $\underline{s}\backslash pn$: $\lambda\underline{x}_{s\delta}\lambda\underline{w}_{s\omega}.\ [\textsc{max}\langle ?\Omega, hope_{\underline{w}}\,\underline{x}\rangle \subseteq \perp\omega\|]$

For example, the fact-oriented *att*-report (40) is assigned the representation (41). In the topical speech world ($\top\omega$), Ole has a belief about his own modality ($\top\omega\|$). In the top-ranked worlds of this modality, his son's victory is a verifiable fact.

(40) *Ole-p irni-ni (*aqagu) ajugaa-**suri**-pa-a.*
Ole-ERG son-3S$_\mathrm{T}$ (*tomorrow) win-bel$_\perp$-DEC$_{\mathrm{T}\perp}$-3S.3S
'Ole believes his son to have won (*tomorrow).'

(41) $^{\mathrm{T}}[x|\, x =_i ole]; [x|\, son_{\mathrm{T}\omega}\langle x, \top\delta\rangle]; [w|\, win_w\langle\bot\delta\rangle]; [\text{MAX}\{\top\omega\|, bel_{\mathrm{T}\omega}\top\delta\} \subseteq \bot\omega\|_{\bot\delta}];$
$^{\mathrm{T}}[p|\, p = \top\omega\|]$

In discourse (42), sentence (i) reports Ole's desire and hope, while (ii) makes a related prediction. Modal reference is explicated in (43i, ii). In the input to (43i) the topical modality ($\top\Omega$) is the initial common ground. This is the modal base of Ole's desire-and-hope. Within this topical modality, the topical Ole wins in every world that best fits what he desires and hopes in the topical speech world ($\top\omega$). The topical modality is updated to the set of surviving speech worlds, where Ole is in this attitudinal state. (43ii) represents the reading of (42ii) where the unspecified attitude-holder ($?\delta$) is resolved to the speaker (I) and the expectation is contingent on Ole's victory (anaphora to the winning worlds by $\bot\omega$). In the topical speech world ($\top\omega$) the speaker has a certain expectation about the current topical modality ($\top\Omega$), i.e. the updated common ground where Ole is in the aforementioned state of desire and hope. In the worlds of this topical modality that best fit the speaker's ($\top\omega$-)expectations, Ole does win (anaphora by $\bot\omega$) and his ($\top\omega$-)wife is happy.

(42) i. *Ole* *niriuk-pu-q* *(aqagu)* *ajugaa-**ssa**-llu-ni.*
Ole hope-DEC$_{\mathrm{T}}$-3S (tomorrow) win-des$^{>}$-ELA$_{\mathrm{T}}$-3S$_{\mathrm{T}}$
'Ole hopes to win (tomorrow).'
ii. *Nuli-a* *nuannaar-**ssa**-pu-q.*
wife-3S$_{\bot}$ happy-exp$^{>}$-DEC$_{\mathrm{T}}$-3S
'His wife will be happy.'

(43) i. $^{\mathrm{T}}[x|\, x =_i ole]; [w|\, win_w\langle\top\delta\rangle]; [\text{MAX}\langle\top\Omega, des_{\mathrm{T}\omega}\top\delta\rangle \subseteq \bot\omega\|]; [\text{MAX}\{\top\Omega,$
$hope_{\mathrm{T}\omega}\top\delta\} \subseteq \bot\omega\|]; {}^{\mathrm{T}}[p|\, p = \top\omega\|]$
ii. $[x|\, x = \top\delta]; {}^{\mathrm{T}}[x|\, wife_{\mathrm{T}\omega}\langle x, \bot\delta\rangle]; [happy_{\bot\omega}\langle\top\delta\rangle]; [\text{MAX}\langle\top\Omega, exp_{\mathrm{T}\omega}\,\mathrm{I}\rangle \subseteq \bot\omega\|];$
$^{\mathrm{T}}[p|\, p = \top\omega\|]$

In summary, fact-oriented *att*-suffixes are modally *de se*, prospect-oriented *att*-suffixes are *de* $\top\Omega$, whereas attitudinal roots are modally unspecified.

4.3. Subjective facts vs. projected consequences

Attitudinal states have a beginning and an end, like all human states. Throughout life we form and abandon beliefs, expectations, desires, regrets, anxieties, and so on. At any point we may wish to talk about past, present, or future attitudinal states. In the temporally explicit language of UC an attitudinal *p*-set is therefore based not on an individual, but on an attitudinal state or on a concurrent event centered on the attitude holder (recall Table 3.i).

Enriched with temporal referents, the proposed lexical entries for report items are given below. According to the *ego* (CTR $\bot\sigma$) of a fact-oriented belief state, '-bel$_{\bot}$', the event of the base (EVT $\bot\eta$, with $\eta \in \{\varepsilon, \sigma\}$) is a currently verifiable fact. That is, it is realized in the same world as, and prior to, this attitudinal state. In contrast, the *ego* of a prospect-oriented state of expectation, '-exp$^{>}$', views the event of the base (EVT $\bot\eta$) as a projected consequence of a contextually salient event ($?\varepsilon$). In the ideal worlds of the topical domain ($\top\Omega$) the projected consequence is a verifiable fact by the end of this attitudinal state.

-bel$_{\bot}$ $\vdash$ $(\underline{\mathrm{s}}\backslash \mathrm{pn})\backslash\underline{\mathrm{s}}\colon \lambda\underline{V}\lambda\underline{x}\lambda\underline{w}.(\underline{V}\ \bot\omega^{\bot};\ [t|\ \vartheta_{\bot\omega}\ \mathrm{EVT}\ \bot\eta <_i t,\ t \subset_i \vartheta_{\bot\omega}\ \mathrm{STA}\ \bot\eta])\ ;$
$[s|\ \vartheta_{\underline{w}}\ s =_i \bot\tau,\ \mathrm{CTR}\ s =_i \underline{x}];\ [\mathrm{MAX}\{\underline{w}\|,\ bel_{\underline{w}}\ \bot\sigma\} \subseteq \bot\omega\|_{\bot\sigma,\ \bot\delta}]$
-exp$^{>}$ $\vdash$ $\underline{\mathrm{s}}\backslash\underline{\mathrm{s}}\colon \lambda\underline{V}\lambda\underline{w}.(\underline{V}\ \bot\omega^{\bot};\ [\mathrm{EVT}\ \bot\eta =_{\bot\omega} \mathrm{CON}\ ?\varepsilon]);\ [s|\ \mathrm{EVT}\ \bot\eta <_{\bot\omega} \mathrm{END}\ s];$
$[\mathrm{MAX}\{\top\Omega,\ exp_{\underline{w}}\ \bot\sigma\} \subseteq \bot\omega\|_{\bot\sigma}]$
hope- $\vdash$ $\underline{\mathrm{s}}\backslash \mathrm{pn}\colon \lambda\underline{x}\lambda\underline{w}.\ [s|\ \mathrm{CTR}\ s =_i \underline{x}];\ [\mathrm{MAX}\{?\Omega,\ hope_{\underline{w}}\ \bot\sigma\} \subseteq \bot\omega\|_{\bot\sigma}\}]$

This correctly predicts that only prospect-oriented *att*-suffixes allow future location times. For discourse (42i, ii) temporal reference is explicated in (44i, ii). In (44i) topic-elaborating mood on a state of desire identifies it with the topical Ole's state of hope, by equating both with the same topical state. The resulting representation is coherent because 'tomorrow-$_{\varepsilon}$' locates the desired victory, whereas the attitudinal state of desire is verifiable now. In (44ii) the wife's happy state is an expected consequence of Ole's victory.

(44i) (42i) Ole hopes to win tomorrow.
Ole hope-DEC$_{\mathrm{T}}$-3S tomorrow-$_{\varepsilon}$ win-des$^{>}$-ELA$_{\mathrm{T}}$-3S$_{\mathrm{T}}$
$^{\mathrm{T}}[x|\ x =_i ole];\ ((^{\mathrm{T}}[s];\ [e\ w|\ win_w\langle e,\ \mathrm{CTR}\ \top\sigma\rangle,\ \vartheta_w\ e \subseteq_i day.after\langle \vartheta_{\mathrm{T}\omega}\top\varepsilon\rangle,\ e \subset_w \mathrm{CON}\ \top\varepsilon]$
$;\ [s|\ \bot\varepsilon <_{\bot\omega} \mathrm{END}\ s];\ [\mathrm{MAX}\langle\top\Omega,\ des_{\mathrm{T}\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}];\ [\top\sigma =_i \bot\sigma])\ ^{\mathrm{T}};\ ([s|\ \mathrm{CTR}\ s =_i$
$\top\delta];\ [\mathrm{MAX}\langle\top\Omega,\ hope_{\mathrm{T}\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}];\ [\top\sigma =_i \bot\sigma]));\ [\top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \bot\sigma,\ \mathrm{BEG}\ \bot\sigma$
$<_{\mathrm{T}\omega}\top\varepsilon];\ ^{\mathrm{T}}[p|\ p = \top\omega\|]$

(44ii) (42ii) His wife will be happy.
wife-3s$_{\bot}$ happy-exp$^{>}$-DEC$_{\mathrm{T}}$-3S
$[x|\ x =_i \top\delta];\ ^{\mathrm{T}}[x|\ wife_{\mathrm{T}\omega}\langle x,\ \bot\delta,\ \top\tau\rangle];\ [s|\ happy_{\bot\omega}\langle s,\ \top\delta\rangle,\ \mathrm{BEG}\ s \subset_{\bot\omega} \mathrm{CON}\ \bot\varepsilon];\ [s|$
$\mathrm{BEG}\ \bot\sigma <_{\bot\omega} \mathrm{END}\ s];\ [\mathrm{MAX}\langle\top\Omega,\ exp_{\mathrm{T}\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}];\ [\top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \bot\sigma,\ \mathrm{BEG}\ \bot\sigma$
$<_{\mathrm{T}\omega}\top\varepsilon];\ ^{\mathrm{T}}[p|\ p = \top\omega\|]$

In contrast, a future location time cannot be coherently added to the temporally explicit representation (45) of the fact-oriented belief report (40). The declarative mood asserts that Ole is in a currently verifiable state of belief. The beginning of this attitudinal state must therefore precede the speech act. But this state-onset also serves as the perspective point for Ole, the attitude holder, and according to him, his son's victory is verifiable from that point. Therefore, the son's victory cannot be located in the future of the speech act either.

(45) (40) Ole believes his son to have won (*tomorrow).
Ole-ERG son-3S$_{\mathrm{T}}$ (*tomorrow-$_{\varepsilon}$) win-bel$_{\bot}$-DEC$_{\mathrm{T}\bot}$-3S.3S
$^{\mathrm{T}}[x|\ x =_i ole];\ [x|\ son_{\mathrm{T}\omega}\langle x,\ \top\delta,\ \top\tau\rangle];\ [t\ e\ w|\ win_w\langle e,\ \bot\delta\rangle,\ \vartheta_w\ e <_i t,\ t \subset_i \vartheta_w\ \mathrm{CON}\ e];$
$[s|\ \vartheta_{\mathrm{T}\omega}\ s =_i \bot\tau,\ \mathrm{CTR}\ s =_i \top\delta];\ [\mathrm{MAX}\langle\top\omega\|,\ bel_{\mathrm{T}\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma,\ \bot\delta}];\ [\top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \bot\sigma,$
$\mathrm{BEG}\ \bot\sigma <_{\mathrm{T}\omega}\top\varepsilon];\ ^{\mathrm{T}}[p|\ p = \top\omega\|]$

In summary, *att*-suffixes in fact-oriented moods introduce currently verifiable attitudinal states (or speech events). If the *att*-suffix is likewise fact-oriented, then the attitude-holder views the *att*-base event as a currently verifiable fact of his own modality. If the *att*-suffix is prospect-oriented, then he views it as a projected consequence of a contextually salient event. In his ideal worlds of the topical modality the projected event becomes a verifiable fact by the end of the prospect-oriented attitudinal state.

5. Conditional attitudes

5.1. Observations

Cross-linguistically, conditionals behave like modal topic-comment structures (recall section 2.1). The antecedent introduces a topical sub-domain of the modal base (Kratzer 1981), while the matrix comments on this topical sub-domain ($\top\mathit{\Omega}$). In Kalaallisut the antecedent is in the prospect-oriented hypothetical mood (HYP), whereas the matrix comment must contain a *prospect-oriented attitudinal correlate*, on pain of ungrammaticality (*). The correlate can be a prospect-oriented *att*-suffix (e.g. (46a, b), (47a, b)), prospect-oriented illocutionary mood (e.g. OPT in (46c)), or an implicitly attitudinal root that can be read as prospect-oriented (e.g. (47c)).

(46) *Ole ajugaa-**gu**-ni* …
Ole win-HYP$_{\mathrm{T}}$-3S$_{\mathrm{T}}$ …
'If (or when) Ole$^{\mathrm{T}}$ wins' …
a. … *isir-*{***-ssa*** | ***-qina*** | ***-sinnaa***}*-pu-q.*
… enter-{-exp$^{>}$ | -dread$^{>}$ | -possible$^{>}$}-DEC$_{\mathrm{T}}$-3S
'… he$_{\mathrm{T}}$ is {expected to | liable to | might} drop in.'
b. … *isir-*{***-ssanga*** | ***-niar*** | ***-rusuk***}*-pu-q.*
… enter-{-exp$_{se}^{>}$ | -int$_{se}^{>}$ | -des$_{se}^{>}$}-DEC$_{\mathrm{T}}$-3S
'… he$_{\mathrm{T}}$ {expects | intends | wants} to drop in.'
c. … *isir-**li**!* | **isir-pu-q.*
… enter-OPT.3S | *enter-DEC$_{\mathrm{T}}$-3S
'… let him$_{\mathrm{T}}$ drop in! | *he$_{\mathrm{T}}$ has dropped in.'

(47) *Ole ajugaa-**pp**-at* …
Ole win-HYP$_{\perp}$-3S$_{\perp}$ …
'If (or when) Ole$^{\perp}$ wins …'
a. … *Aani-p isir-*{***-ssangatit*** | **-suri*}*-pa-a.*
… Ann-ERG enter-{-exp$_{\perp}^{>}$ | *-bel$_{\perp}$}-DEC$_{\mathrm{T}\perp}$-3S.3S
'… Ann {expects him$_{\perp}$ to drop in | *believes him$_{\perp}$ to have dropped in}.'
b. … *Aani-p isir-*{***-qqu*** | **-nirar*}*-pa-a.*
… Ann-ERG enter-{-bid$_{\perp}^{>}$ | *-say$_{\perp}$}-DEC$_{\mathrm{T}\perp}$-3S.3S
'… Ann has {told him$_{\perp}$ to drop in | *said he$_{\perp}$ has dropped in}.'
c. … ***ajunngit**-la-q* | **nuannaar-pu-nga.*
… fine-DEC-3S | *happy-DEC$_{\mathrm{T}}$-1S
'… that's fine (by me). | *… (NOT: I am happy.)'

OBSERVATION 3. A dependent in the hypothetical mood (HYP) requires a prospect-oriented attitudinal correlate in the matrix, on pain of ungrammaticality.

I propose to derive this observation from topic-comment sequencing. Recall that a topic-comment sequence (A^{T}; B) reduces to plain (A; B), iff the topic update A extends the input $\top$-list with at least one object, and the top object in the output of A is referred to in the comment B by an anaphor $\top a$, for some type a, and maintains its $\top a$-prominence rank throughout B. Otherwise, the input state of information is reduced to the absurd state ($\varnothing$). I propose that conditionals are topic-comment sequences with $a = \mathit{\Omega}$. In Kalaallisut, the dependent in the hypothetical mood introduces an Ω-topic and the topic-comment sequencing operator $(\ldots{}^{\mathrm{T}};\ldots)$, whereas the $\top\Omega$-anaphor comes from the attitudinal correlate.

5.2. Conditional = modal topic + attitudinal comment

In Kalaallisut the dependent hypothetical mood (HYP) forms a modal topic-comment sequence with the verbal base of the modified verb (see section 7 for compositional details). The modal topic is the set of worlds, within a salient modal base $(?\omega\|)$, where the antecedent hypothesis is realized. The modified verbal base must comment on this topical sub-domain, lest the output of the topic-comment sequence $(A\ {}^{\mathrm{T}}; B)$ be the absurd state $(\perp)$. That is why the modified verbal base must contain a $\top\Omega$-anaphor.

-HYP $\vdash$ $(\underline{\mathrm{s}}/\underline{\mathrm{s}})\backslash\mathrm{pn}\backslash\mathrm{iv}$: $\lambda\underline{P}\lambda\underline{x}\lambda\underline{V}\lambda\underline{w}.(\underline{P}\ \underline{x} \perp\omega, [\perp\omega \in\ ?\omega\|]; {}^{\mathrm{T}}[p|\ p = \perp\omega\|])\ {}^{\mathrm{T}}; \underline{V}\ \underline{w}$

For example, in discourse (48) a report of a conditional promise by Ole (48i) is followed by a conditional prediction (48ii), contingent both on its own antecedent and on Ole making good on his promise. Modal reference is explicated in (49i, ii). In (49i) the antecedent clause introduces a topical hypothesis: the set of worlds, within the common ground $(\top\omega\|)$, where Ole wins. In the consequent, this topical sub-domain $(\top\Omega)$ is the modal base of an attitudinal comment. This introduces Ole's promise as a $(\top\omega$-)real speech event resulting in a $(\top\omega$-)real state of obligation and expectation. In the antecedent $(\top\Omega$-)worlds that best fit Ole's $(\top\omega$-)obligations and expectations he drops in. Note that Ole need not expect and has not promised to win. His promise and expectation are contingent on his victory, which may be a long shot. The intuition that (48ii) is contingent not only on its own antecedent but also on (48i) is explicated in (49ii) as modal anaphora ('modal subordination' á la Stone 1997, Brasoveanu 2007). The declarative matrix introduces a $(\top\omega$-)real state of expectation of the speaker. The modal base $(\top\Omega)$ of this attitudinal state is the current antecedent hypothesis, i.e. the sub-class of the promised dropping-in worlds (modal anaphora by $\perp\omega$) where the speaker's wife buys some wine. In the modal-base $(\top\Omega$-)worlds that best fit the speaker's $(\top\omega$-)expectations the topical Ole $(\top\delta)$ is happy.

(48) i. *Ole* *ajugaa-**gu**-ni* *niriursui-pu-q* *isir-**ssa**-llu-ni.*
Ole win-HYP$_{\mathrm{T}}$-3S$_{\mathrm{T}}$ *promise*-DEC$_{\mathrm{T}}$-3S enter-exp$^{>}$-ELA$_{\mathrm{T}}$-3S$_{\mathrm{T}}$
'If Ole$^{\mathrm{T}}$ wins, he$_{\mathrm{T}}$ has promised to drop in.'
ii. *Nulia-ra* *viinni-si-**pp**-at* *nuannaar-**ssa**-pu-q.*
wife-1S wine-get-HYP$_{\perp}$-3S$_{\perp}$ happy-exp$^{>}$-DEC$_{\mathrm{T}}$-3S
'If my wife gets some wine, he$_{\mathrm{T}}$'ll be happy.'

(49) i. $(({}^{\mathrm{T}}[x|\ x =_i ole]; [w|\ win_w\langle\top\delta\rangle]; [\perp\omega \in \top\omega\|]; {}^{\mathrm{T}}[p|\ p = \perp\omega\|])\ {}^{\mathrm{T}}; ([enter_{\perp\omega}\langle\top\delta\rangle];$
$[\mathrm{MAX}\langle\top\Omega, exp_{\mathrm{T}\omega}\top\delta\rangle \subseteq \perp\omega\|]; [spk_{\mathrm{T}\omega}\langle\top\delta\rangle]; [\mathrm{MAX}\langle\top\Omega, obl_{\mathrm{T}\omega}\top\delta\rangle \subseteq \perp\omega\|]));$
${}^{\mathrm{T}}[p|\ p = \top\omega\|]$
ii. $(([x|\ wife_{\mathrm{T}\omega}\langle x, \mathrm{I}\rangle]; [wine.get_{\perp\omega}\langle\perp\delta\rangle]; [\perp\omega \in \top\omega\|]; {}^{\mathrm{T}}[p|\ p = \perp\omega\|])\ {}^{\mathrm{T}};$
$([happy_{\perp\omega}\langle\top\delta\rangle]; [\mathrm{MAX}\langle\top\Omega, exp_{\mathrm{T}\omega}\mathrm{I}\rangle \subseteq \perp\omega\|])); {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

Conditional expectations may also concern consequences of past events, as in the grammatical version of discourse (50i, ii), which is analyzed in (51i, ii).

(50) i. *Kennedy* *tuqut-taa-pu-q.*
Kennedy kill-pssv-DEC$_{T}$-3S
'Kennedy was assassinated.'
ii. *Oswald-p* *tuqut-sima-nngit-**pp**-a-gu*
Oswald-ERG kill-prf-not-HYP$_{\perp}$-3S$_{\perp}$-3S$^{\perp}$
inuk-piluk-qat-a-ata tuqut-sima-(-**ssa**)-pa-a.*
man-bad-other-3S$_{\perp}$-ERG kill-prf-*(-exp$^{>}$)-DEC$_{T\perp}$-3S.3S
'If Oswald didn't kill him, then someone else did.'

(51) i. $^{\top}[x|\ x =_i jfk]; [x|\ kill_{\top\omega}\langle x, \top\delta\rangle]; {}^{\top}[p|\ p = \top\omega\|]$
ii. $(([w\ x|\ x =_i osw, kill_w\langle x, \top\delta\rangle]; [w|\ w \notin \perp\omega\|]; [\perp\omega \in \top\omega\|]; {}^{\top}[p|\ p = \perp\omega\|])^{\top};$
$([x|\ x =_i \top\delta]; {}^{\top}[x|\ man_{\perp\omega}\langle x\rangle]; [bad\{\top\delta, \top\delta\|_{\perp\omega}\}]; [\perp\delta_2 \in \top\delta\|]; [\top\delta \neq_i \perp\delta_2];$
$[kill_{\perp\omega}\langle\top\delta, \perp\delta\rangle]; [\text{MAX}\langle\top\Omega, exp_{\top\omega}\,\text{I}\rangle \subseteq \perp\omega\|])); {}^{\top}[p|\ p = \top\omega\|]$

In the output of (51i) JFK is assassinated throughout the common ground (output $\top\omega\|$). The conditional (51ii) introduces a ($\top\omega$-)real state of expectation based on this ($\top\omega$-)real assassination event. The modal base ($\top\Omega$) is the topical sub-domain, of the current common ground ($\top\omega\|$), where the assassin is not Oswald. In the modal base worlds that best fit the attitude holder's projections the assassin is someone else.

If the $\top\Omega$-anaphor *-ssa* '-exp$^{>}$' is omitted from the consequent, the conditional (50ii) becomes ungrammatical and uninterpretable (see (52)). For without a $\top\Omega$-anaphor there is no proper comment, so the modal topic-comment sequence formed by the hypothetical mood reduces any input state to the absurd state ($\varnothing$).

(52) $c[\![(([w\ x|\ x =_i osw, kill_w\langle x, \top\delta\rangle]; [w|\ w \notin \perp\omega\|]; [\perp\omega \in \top\omega\|]; {}^{\top}[p|\ p = \perp\omega\|])^{\top};$
$([x|\ x =_i \top\delta]; {}^{\top}[x|\ man_{\top\omega}\langle x\rangle]; [bad\{\top\delta, \top\delta\|_{\top\omega}\}]; [\perp\delta_2 \in \top\delta\|]; [\top\delta \neq_i \perp\delta_2];$
$[kill_{\top\omega}\langle\top\delta, \perp\delta\rangle])); {}^{\top}[p|\ p = \top\omega\|]]\!]^{g} = \varnothing$

5.3. Projected consequences in topical sub-domains

To factor in temporal reference we first spell it out in the entries of two key moods: hypothetical (HYP) and topic-elaborating (ELA$_{T}$):

-HYP $\vdash$ $(\underline{s}/\underline{s})\backslash pn\backslash iv: \lambda\underline{P}\lambda\underline{x}\lambda\underline{V}\lambda\underline{w}. ((\underline{P}\ \underline{x}\ \perp\omega^{\perp}; [?\varepsilon <_{\perp\omega} \text{EVT}\ \perp\eta]); [\perp\omega \in\ ?\omega\|];$
$^{\top}[p|\ p = \perp\omega\|])^{\top}; \underline{V}\ \underline{w}$
-ELA$_{T}$ $\vdash$ $(\underline{s}/\underline{s})\backslash pn\backslash iv: \lambda\underline{P}\lambda\underline{x}\lambda\underline{V}\lambda\underline{w}. ({}^{\top}[s]^{\top}; (\underline{P}\ \underline{x}\ \underline{w}^{\perp}; [\top\sigma =_i \text{STA}\ \perp\eta]))^{\top}; (\underline{V}\ \underline{w}^{\perp};$
$[\top\sigma =_i \text{STA}\ \perp\eta'])$

Hypothetical mood is prospect-oriented. It introduces a topical sub-domain of a contextually salient set of worlds ($?\omega\|$), where the event-equivalent of the verbal base (EVT $\perp\eta$) is realized after a salient perspective point ($?\varepsilon$). In contrast, topic-elaborating mood is not only modally but also temporally *de se*: it identifies the dependent state-equivalent (STA $\perp\eta$) with the matrix state-equivalent (STA $\perp\eta'$) by equating both with its own topical state.

Both moods are exemplified in discourse (48i, ii). Temporal reference in this discourse is analyzed in (53i, ii) (building on the analysis of modal reference in (49i, ii)). In (53i) the hypothetical antecedent introduces a topical sub-domain of the common ground (input $\top\omega\|$) where Ole wins after this speech act ($\top\varepsilon$). The matrix is required to comment ($^{\top}$;).

The comment is an attitude report: in the speech world ($\top\omega$), Ole has made a promise resulting in a ($\top\varepsilon$-)current state of obligation-and-expectation in regard to the antecedent sub-domain ($\top\Omega$). In the antecedent winning worlds that best fit his ($\top\varepsilon$-)current promise Ole drops in within the consequent state of his victory (CON $\bot\varepsilon$, verification frame for the promise). The subordinated conditional prediction (48ii) introduces a ($\top\varepsilon$-)current state of expectation. The modal base (current $\top\Omega$) is the topical sub-domain, of the promised dropping-in worlds (modal anaphora by $\bot\omega$), where the antecedent prospect is realized, i.e. where the speaker's wife buys some wine after this speech act ($\top\varepsilon$). In the modal base worlds that best fit the ($\top\varepsilon$-)current ($\top\omega$-)expectations of the attitude holder (speaker?) there is a happy state of the topical Ole ($\top\delta$) that begins within the consequent state of the wine-buying event (current CON $\bot\varepsilon$, verification frame for this prediction).

(53i) (48i) If Ole$^{\top}$ wins, he$_{\top}$ has promised to drop in.
Ole win-HYP$_{\top}$-3S$_{\top}$ …
$((^{\top}[x|\ x =_i ole]; [e\ w|\ win_w\langle e, \top\delta\rangle, \top\varepsilon <_w e]; [\bot\omega \in \top\omega\|]; {}^{\top}[p|\ p = \bot\omega\|])^{\top}; \ldots$
… promise-DEC$_{\top}$-3S enter-exp$^{>}$-ELA$_{\top}$-3S$_{\top}$
$\ldots ((^{\top}[s]; [e|\ enter_{\bot\omega}\langle e, \text{CTR}\ \top\sigma\rangle, e \subset_{\bot\omega} \text{CON}\ \bot\varepsilon]; [s|\ \bot\varepsilon <_{\bot\omega} \text{END}\ s]; [\text{MAX}\langle\top\Omega,$
$exp_{\top\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}]; [\top\sigma =_i \bot\sigma])^{\top}; ([e|\ spk_{\top\omega}\langle e, \top\delta\rangle]; [\text{MAX}\langle\top\Omega, obl_{\top\omega}\ \text{CON}\ \bot\varepsilon\rangle$
$\subseteq \bot\omega\|_{\bot\varepsilon}\}]; [\top\sigma =_i \text{CON}\ \bot\varepsilon]))); [\top\tau \subset_i \text{CON}\ \bot\varepsilon, \bot\varepsilon <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega\|]$

(53ii) (48ii) If my wife$^{\bot}$ gets some wine, he$_{\top}$'ll be happy.
wife-1S wine-get-HYP$_{\bot}$-3S$_{\bot}$…
$(([x|\ wife_{\top\omega}\langle x, \text{CTR}\ \top\varepsilon, \top\tau\rangle]; [e|\ wine_{\bot\omega}\langle \text{BCK}\ e, \vartheta_{\bot\omega}\ e\rangle, get_{\bot\omega}\langle e, \bot\delta, \text{BCK}\ e\rangle,$
$\top\varepsilon <_{\bot\omega} e]; [\bot\omega \in \top\omega\|]; {}^{\top}[p|\ p = \bot\omega\|])^{t}; \ldots$
… happy-exp$^{>}$-DEC$_{\top}$-3S
$\ldots ([s|\ happy_{\bot\omega}\langle s, \top\delta\rangle, \text{BEG}\ s \subset_{\bot\omega} \text{CON}\ \bot\varepsilon]; [s|\ \text{BEG}\ \bot\sigma <_{\bot\omega} \text{END}\ s]; [\text{MAX}\langle\top\Omega,$
$exp_{\top\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}])); [\top\tau \subset_i \vartheta_{\top\omega}\ \bot\sigma, \text{BEG}\ \bot\sigma <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega\|]$

For discourse (50i, ii), temporal reference is explicated in (54i, ii) (building on (51i, ii)). In the output of (54i) there is an assassination event before this speech act ($\top\varepsilon$) throughout the common ground ($\top\omega\|$). This real event is the basis of the real state of expectation introduced in (54ii). The modal base is the topical sub-domain of the common ground ($\top\omega\|$), where the assassin is not Oswald. Within this sub-domain, the worlds that best fit the attitude holder's expectations are those where the real assassination event ($\bot\varepsilon_3$) is followed by the consequent state of an assassination by an agent other than Oswald.

(54i) (50i) Kennedy was assassinated.
Kennedy-$^{\top}$ kill-pssv-DEC$_{\top}$-3S
${}^{\top}[x|\ x =_i jfk]; [e|\ kill_{\top\omega}\langle e, \text{CTR}\ e, \top\delta\rangle, \top\tau \subset_i \vartheta_{\top\omega}\ \text{CON}\ e, e <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega\|]$

(54ii) (50ii) If Oswald didn't kill him, someone else did.
Oswald-ERG kill-prf-not-HYP$_{\bot}$-3S$_{\bot}$-3S$^{\bot}$ …
$([x|\ x =_i osw]; [e\ w|\ kill_w\langle e, \bot\delta, \top\delta\rangle]; [s|\ s =_i \text{CON}\bot\varepsilon, \top\tau \subset_i \vartheta_{\bot\omega}\ s]; [w|\ w \notin \bot\omega\|_{\top\tau}];$
$[s|\ \text{CTR}\ s =_i \bot\delta, \top\tau \subset_i \vartheta_{\bot\omega}\ s, \bot\varepsilon_2 <_{\bot\omega} \text{BEG}\ s]; [\bot\omega \in \top\omega\|]; {}^{\top}[p|\ p = \bot\omega\|])^{\top};$
$([x|\ x = \top\delta]; \ldots$
… man-bad-other-3S$_{\bot}$-ERG kill-prf-exp$^{>}$-DEC$_{\top\bot}$-3S.3S
$\ldots {}^{\top}[x|\ man_{\bot\omega}\langle x, \vartheta_{\bot\omega}\ \bot\varepsilon_2\rangle]; [bad\{\top\delta, \top\delta\|_{\bot\omega}, \vartheta_{\bot\omega}\ \bot\varepsilon_2\}]; [\bot\delta_2 \in \top\delta\|]; [\top\delta \neq_i \bot\delta_2];$
$[e|\ kill_{\bot\omega}\langle e, \top\delta, \bot\delta\rangle]; [s|\ s =_i \text{CON}\ \bot\varepsilon, \text{BEG}\ s \subset_{\bot\omega} \text{CON}\bot\varepsilon_3]; [s|\ \text{BEG}\ \bot\sigma <_{\bot\omega} \text{END}\ s];$
$[\text{MAX}\langle\top\Omega, exp_{\top\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}]); [\top\tau \subset_i \vartheta_{\top\omega}\ \bot\sigma, \text{BEG}\ \bot\sigma <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega\|]$

In summary, Kalaallisut instantiates the cross-linguistic generalization that conditionals are modal topic-comment sequences. Given a contextually salient modal base, the antecedent introduces a topical sub-domain where a hypothetical prospect, viewed from a contextually salient perspective point, is realized. The comment introduces a prospect-oriented attitude to a projected consequence—of the antecedent event (as in (53i, ii)) or of the initial perspectival event (as in (54ii))—in this topical sub-domain. This attitudinal state is a currently verifiable fact even if the modal object of the attitude is not. Indeed, the modal object need not even be considered possible, as the next section will show.

6. Attitudes to remote modalities

6.1. Observations

Stone (1997) argues that, in addition to anaphoric tenses (Reichenbach 1947, Partee 1973, Webber 1988, a.o.), English has anaphoric modals. He proposes a parallel theory, where temporal relations between the speech time and the topic time, e.g. *past*, *present*, and *future*, are paralleled by modal relations between the speech modality and the topical modality, e.g., *real*, *vivid* (i.e. realistic, desirable, etc), and *remote* (counterfactual, undesirable, etc). Stone/Hardt (1999) further propose that the English negation *not* introduces a referent for the scope proposition and asserts that it is disjoint (remote) from the common ground.

In Kalaallisut discourse reference to remote modalities is expressed by derivational suffixes. For example, the negation suffix *-nngit* ‘not’ asserts that the world of evaluation is remote from the scope proposition (same as English *not*), and introduces a concurrent non-scope state (section 3.3). Another ‘negative’ suffix, *-galuar* ‘rem’, which often elaborates negation, asserts that the world of evaluation is sub-optimal given what the speaker (or topic) believes or wants. Typical uses of this suffix are described and exemplified below (Observation 4 in (55), (58i, ii), Observation 5 in (56)–(59), Observation 6 in (58ii), (59ii)).

OBSERVATION 4. If a currently verifiable fact has an unexpected and/or undesirable circumstance, then the fact or the circumstance is marked as remote.

OBSERVATION 5. An attitude or speech whose modal object is unlikely or undesirable (or negated) is marked as remote (or negative).

OBSERVATION 6. A counterfactual, unlikely, or undesirable hypothesis is marked as remote.

(55) *Ole ullumi ajugaagaluarluni isinngilaq.*
*Ole ullumi ajugaa-**galuar**-llu-ni isir-nngit-la-q*
Ole today win-rem-ELA$_T$-3S$_T$ enter-not-DEC-1S
‘Ole won today, but didn’t drop in.’

(56) *Ole neriukkaluarpoq ajugaassalluni. Nulia nuannaassagaluarpoq.*
*Ole niriuk-**galuar**-pu-q ajugaa-ssa-llu-ni. nulia-a nuannaar-ssa+**galuar**-pu-q*
Ole hope-rem-DEC$_T$-3S win-des$^>$-ELA$_T$-3S$_T$ wife-3S$_\perp$ happy-exp$^>$+rem-DEC$_T$-3S
'Ole hopes to win (long shot). His wife would be happy.'

(57) *Ole aqagu iseqqunngilara. Taamaattumik isissanngilaq.*
*Ole aqagu isir-qqu+**nngit**-la-ra. taamaattumik isir-ssa+**nngit**-la-q*
Ole tomorrow enter-bid$_\perp^>$+not-DEC-1S.3S therefore enter-exp$^>$+not-DEC-3S
'I have told Ole not to drop in tomorrow. So he won't (isn't expected to) drop in.'

(58) i. *Nuliaqaraluarlunga meeraqanngilanga.*
*nulia-qar-**galuar**-llu-nga miiraq-qar-nngit-la-nga.*
wife-have-rem-ELA$_T$-1S kid-have-not-DEC-1S
'I have a wife, but no kid(s).'
ii. *Erneqaraluaruma ajunnginnerutikkaluarpara.*
*irni-qar-**galuar**-gu-ma ajunngit-niru-tit-**galuar**-pa-ra*
son-have-rem-HYP$_T$-1S fine-er-tv-rem-DEC$_{T\perp}$-1S.3S
'I wish I had a son. (*lit*. I prefer the remote hypothetical worlds where…)'
iii. *Taava toquguma taassuma nuliara najussagaluarpaa.*
*taava tuqu-gu-ma taassuma nulia-ra najur-ssa+**galuar**-pa-a.*
then die-HYP$_T$-1S that.ERG wife-1S be.with-exp$^>$+rem-DEC$_{T\perp}$-3S.3S
'Then when I die, he would've been there for my wife.'

(59) i. *Kennedy toqutaavoq akerapassuaqarami.*
Kennedy tuqut-taa-pu-q akiraq-passua-qar-ga-mi
Kennedy kill-pssv-DEC$_T$-3S enemy-many-have-FCT$_T$-3S$_T$
'Kennedy was assassinated because he had many enemies.'
ii. *Oswaldip toqusimanngikkaluarpagu*
*Oswald-p tuqut-sima-nngit-**galuar**-pp-a-gu*
Oswald-ERG kill-prf-not-rem-HYP$_\perp$-3S$_\perp$-3S$^\perp$
inupiloqataata toqusimassagaluarpaa.
*inuk-piluk-qat-a-ata tuqut-sima-ssa+**galuar**-pa-a.*
man-bad-other-3S$_\perp$-ERG kill-prf-exp$^>$+rem-DEC$_{T\perp}$-3S.3S
'If Oswald hadn't killed him someone else would've.'

To account for these observations, I propose to build on the idea that negation involves discourse reference to a remote modality (Stone/Hardt 1999). For the negation suffix (*-nngit*) this idea has already been implemented (in section 3 and (51ii)). In addition, I propose that the remoteness suffix (*-galuar*) is implicitly attitudinal: it asserts that the world of evaluation is remote from (not among) the modal base worlds that are top-ranked by the beliefs, expectations, or desires of a current center of empathy (speaker or topic). Given the proposed analysis of fact-oriented mood, hypothetical mood, and attitude reports, Observations 4–6 are then accounted for, as sections 6.2 and 6.3 explicate for modal and temporal reference in turn.

6.2. Remoteness from attitudinal ideal

The following lexical entry implements the idea that the remoteness suffix *-galuar* 'rem' implies an attitude to a contextually salient modal base ($?\omega\|$). It asserts that the world of evaluation ($\underline{w}$) is remote from ($\notin$) the top-ranked modal base worlds. The ranking criteria are the beliefs, expectations, or desires of a current center of empathy in the topical speech world ($att_{\mathrm{T}\omega}\ ?\delta$, with $att \in \{bel, exp, des\}$ and $?\delta \in \{\top\delta, \text{CTR } \top\varepsilon\}$). The modal base ($?\omega\|$) includes both the speech world ($\top\omega$) and the scope world ($\bot\omega$). The world of evaluation ($\underline{w}$) is one of these two worlds. If the remoteness suffix is attached to an attitudinal RPT-suffix, then the two form a complex attitude (e.g. *-ssa+galuar* 'exp$^{>}$+rem'). In effect, their relative scope is reversed (e.g. '$\underline{\mathrm{s}}$-exp$^{>}$+rem' is interpreted as '($\underline{\mathrm{s}}$-rem)-exp$^{>}$').

-rem $\vdash$ $\underline{\mathrm{s}}\backslash\underline{\mathrm{s}}$: $\lambda\underline{V}\lambda\underline{w}.\ \underline{V}\bot\omega, [\bot\omega,\top\omega \in\ ?\omega\|]; [\underline{w} \notin \mathrm{MAX}\{?\omega\|, att_{\mathrm{T}\omega}\ ?\delta\}]$

For example, modal reference in discourse (58i, ii) is analyzed in (60i, ii). (The subordinated counterfactual (58iii) involves temporal anaphora; it is analyzed in section 6.3.) In (60i) the modal base of '-rem' is the set of worlds where the speaker has a wife ($\bot\omega\|$). The world of evaluation ($\top\omega$) is in this domain, but not in the speaker's preferred sub-domain. Neither is it in the sub-domain where the speaker has a kid. This suggests that the speaker would prefer a kid-and-wife world to the actual wife-only world.

(60i) (58i) I have a wife, but no kid(s).
wife-have-rem-ELA$_{\mathrm{T}}$-1S kid-have-not-DEC-1S
$[w|\ wife.have_w\langle\mathrm{I}\rangle]; [\bot\omega,\top\omega \in \bot\omega\|]; [\top\omega \notin \mathrm{MAX}\{\bot\omega\|, att_{\mathrm{T}\omega}\,\mathrm{I}\}]; [w|\ kid.have_w\langle\mathrm{I}\rangle];$
$[\top\omega \notin \bot\omega\|]; {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

(60ii) (58ii) I wish I had a son.
son-have-rem-HYP$_{\mathrm{T}}$-1S fine-er-tv-rem-DEC$_{\mathrm{T}\bot}$-1S.3S
$(([son.have_{\bot\omega}\langle\mathrm{I}\rangle]; [\bot\omega,\top\omega \in \bot\omega_2\|]; [\bot\omega \notin \mathrm{MAX}\{\bot\omega_2\|, bel_{\mathrm{T}\omega}\,\mathrm{I}\}]; {}^{\mathrm{T}}[p|\ p = \bot\omega\|])^{\mathrm{T}};$
$([des_{\mathrm{T}\omega}\,\mathrm{I}\colon \top\omega \angle \bot\omega]; [\top\Omega = \bot\omega\|]; [\bot\omega,\top\omega \in \bot\omega_2\|]; [\top\omega \notin \mathrm{MAX}\{\bot\omega_2\|, des_{\mathrm{T}\omega}\,\mathrm{I}\}])$
$); {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

The counterfactual (60ii) makes this explicit. The input modal base is the aforementioned domain where the speaker has a wife (current $\bot\omega_2\|$). The topical hypothesis is the sub-domain where he also has a son. Given the speaker's beliefs, which presumably include (60i), this sub-domain is remote from the wife-only sub-domain the speaker believes he inhabits. The main attitudinal comment is that in the topical speech world ($\top\omega$) the speaker prefers the remote topical sub-domain ($\top\Omega$), where he also has a son, to the speech reality ($\top\omega\|$), where he only has a wife.

In the counterfactual Kennedy discourse, the opening sentence (59i) introduces a background fact (FCT), while the counterfactual (59ii) projects an expected consequence of this fact in a remote modality. Modal reference in this discourse is explicated in (61i, ii). In (61i), JFK is assassinated throughout the common ground output by the declarative matrix ($\top\omega\|$). The post-posed factual clause adds a background fact—to wit, a larger modal domain where JFK has many enemies ($\bot\omega\|$). In the following counterfactual (61ii), hypothetical mood picks up this background fact as the modal base (current $\bot\omega_3\|$) and introduces as a topical hypothesis the sub-domain where JFK is not assassinated by Oswald. The remoteness suffix adds that this sub-domain is remote from the speaker's beliefs, i.e. not the modal domain he believes he inhabits. The main attitudinal comment is that within this remote sub-domain, the worlds that best fit the speaker's ($\top\omega$-)expectations are those where JFK is assassinated by someone else.

(61i) (59i) Kennedy was assassinated because he had many enemies.
Kennedy kill-pssv-DEC$_{\mathrm{T}}$-3S enemy-many-have-FCT$_{\mathrm{T}}$-3S$_{\mathrm{T}}$
$^{\mathrm{T}}[x|\ x =_i jfk]; [x|\ kill_{\mathrm{T}\omega}\langle x,\ \top\delta\rangle]; {}^{\mathrm{T}}[p|\ p = \top\omega\|]; [w|\ have.enemies_w\langle\top\delta\rangle]; [\top\omega\| \subseteq \bot\omega\|]$

(61ii) (59ii) If Oswald hadn't killed him, someone else would've.
Oswald-ERG kill-prf-not-rem-HYP$_{\bot}$-3S$_{\bot}$-3S$^{\bot}$…
$(([w\ x|\ x =_i osw,\ kill_w\langle x,\ \top\delta\rangle]; [w|\ w \notin \bot\omega\|]; [\bot\omega, \top\omega \in \bot\omega_3\|]; [\bot\omega \notin \mathrm{MAX}\{\bot\omega_3\|,$
$bel_{\mathrm{T}\omega}\ \mathrm{I}\}]; {}^{\mathrm{T}}[p|\ p = \bot\omega\|])\ ^{\mathrm{T}}; ([x|\ x = \top\delta]; \ldots$
…man-bad-other-3S$_{\bot}$-ERG kill-prf-exp$^{>}$+rem-DEC$_{\mathrm{T}\bot}$-3S.3S
$\ldots{}^{\mathrm{T}}[x|\ man_{\bot\omega}\langle x\rangle]; [bad\{\top\delta, \top\delta\|_{\bot\omega}\}]; [\bot\delta_2 \in \top\delta\|]; [\top\delta \neq_i \bot\delta_2]; [kill_{\bot\omega}\langle\top\delta, \bot\delta\rangle];$
$[\bot\omega, \top\omega \in \bot\omega_3\|]; [\bot\omega \notin \mathrm{MAX}\{\bot\omega_3\|, bel_{\mathrm{T}\omega}\ \mathrm{I}\}]; [\mathrm{MAX}\langle\top\Omega, exp_{\mathrm{T}\omega}\ \mathrm{I}\rangle \subseteq \bot\omega\|]));$
$^{\mathrm{T}}[p|\ p = \top\omega\|]$

6.3. Projected consequences in remote modalities

Unlike stative *att*-suffixes (e.g. -*suri* 'bel$_{\bot}$'), which introduce attitude states, the implicitly attitudinal -*galuar* 'rem' only implies the existence of an attitude state without making it available for anaphora (e.g. temporal anaphora). The temporally explicit entry differs only in that the perspective point is a concurrent event ($?\varepsilon$), not the attitude holder ($?\delta$).

-rem $\vdash$ $\underline{\mathrm{s}}\backslash\underline{\mathrm{s}}$: $\lambda\underline{V}\lambda\underline{w}.\ \underline{V}\,\bot\omega, [\bot\omega, \top\omega \in\ ?\omega\|]; [\underline{w} \notin \mathrm{MAX}\{?\omega\|, att_{\mathrm{T}\omega}\ ?\varepsilon\}]$

Temporal reference in discourse (58i, ii) is explicated in (62i, ii) (building on (60i, ii)). (62iii) extends this analysis to the subordinated counterfactual (58iii), which on this account involves structured anaphora to a wished-for world and eventuality ($\bot\omega$ and $\bot\sigma_2$, adapting Brasoveanu 2007).

(62i) (58i) I have a wife, but no kid(s).
wife-have-rem-ELA$_{\mathrm{T}}$-1S …
$((^{\mathrm{T}}[s]; [s\ w|\ \mathrm{CTR}\ s =_i \mathrm{CTR}\ \top\varepsilon,\ wife_w\langle\mathrm{BCK}\ s, \mathrm{CTR}\ \top\varepsilon, \vartheta_w\, s\rangle]; [\bot\omega, \top\omega \in \bot\omega\|];$
$[\top\omega \notin \mathrm{MAX}\{\bot\omega\|, att_{\mathrm{T}\omega}\ \mathrm{BEG}\ \bot\sigma\}]; [\top\sigma =_i \bot\sigma])\ ^{\mathrm{T}}; \ldots$
… kid-have-not-DEC-1S
$\ldots([s\ w|\ \mathrm{CTR}\ s =_i \mathrm{CTR}\ \top\varepsilon,\ kid_w\langle\mathrm{BCK}\ s, \mathrm{CTR}\ \top\varepsilon, \vartheta_w\ s\rangle, \top\tau \subset_i \vartheta_w\ s]; [\top\omega \notin \bot\omega\|_{\mathrm{T}\tau}];$
$[s|\ \mathrm{CTR}\ s =_i \mathrm{CTR}\ \top\varepsilon, \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ s]; [\top\sigma =_i \bot\sigma])); [\top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \bot\sigma, \mathrm{BEG}\ \bot\sigma <_{\mathrm{T}\omega} \top\varepsilon];$
$^{\mathrm{T}}[p|\ p = \top\omega\|]$

(62ii) (58ii) I wish I had a son.
son-have-rem-HYP$_{\mathrm{T}}$-1S …
$(([s|\ \mathrm{CTR}\ s =_i \mathrm{CTR}\ \top\varepsilon,\ son_{\bot\omega}\langle\mathrm{BCK}\ s, \mathrm{CTR}\ \top\varepsilon, \vartheta_{\bot\omega}\ s\rangle, s =_i \bot\sigma_2]; [\bot\omega, \top\omega \in \bot\omega_2\|];$
$[\bot\omega \notin \mathrm{MAX}\{\bot\omega_2\|, bel_{\mathrm{T}\omega}\top\varepsilon\}]; [\mathrm{BEG}\top\sigma <_{\bot\omega} \mathrm{BEG}\bot\sigma]; {}^{\mathrm{T}}[p|\ p = \bot\omega\|])\ ^{\mathrm{T}}; \ldots$
… fine-er-tv-rem-DEC$_{\mathrm{T}\bot}$-1s.3S
$\ldots([s|\ des_{\mathrm{T}\omega}\ s\!: \top\omega \angle \bot\omega]; [\top\Omega = \bot\omega\|]; [\mathrm{CTR}\ \bot\sigma =_i \mathrm{CTR}\ \top\varepsilon]; [\bot\omega, \top\omega \in \bot\omega_2\|];$
$[\top\omega \notin \mathrm{MAX}\{\bot\omega_2\|, des_{\mathrm{T}\omega}\top\varepsilon\}])); [\top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ \bot\sigma, \mathrm{BEG}\ \bot\sigma <_{\mathrm{T}\omega} \top\varepsilon]; {}^{\mathrm{T}}[p|\ p = \top\omega\|]$

(62iii) (58iii) Then when I die, he would've been there for my wife.
then die-HYP$_{T}$-1s …
$[w|\ w =_i \bot\omega]^{\bot}; (([e|\ die_{\bot\omega}\langle e, \text{CTR}\ \top\varepsilon\rangle, \top\varepsilon <_{\bot\omega} e]; {}^{\top}[p|\ p = \bot\omega||])^{\top}; \ldots$
… that-ERG wife-1S be.with-exp$^{>}$+rem-DEC$_{T\bot}$-3S.3S
$\ldots ({}^{\top}[x|\ x =_i \text{BCK}\ \bot\sigma_2]; [x|\ wife_{\top\omega}\langle x, \text{CTR}\ \top\varepsilon, \top\tau\rangle]; [s|\ be.with_{\bot\omega}\langle s, \top\delta, \bot\delta\rangle];$
$[\bot\omega, \top\omega \in \bot\omega_3||]; [\bot\omega \notin \text{MAX}\{\bot\omega_3||, bel_{\top\omega}\top\varepsilon\}]; [\text{BEG}\bot\sigma \subset_{\bot\omega} \text{CON}\bot\varepsilon];$
$[s|\ \text{BEG}\ \bot\sigma <_{\bot\omega} \text{END}\ s]; [\text{MAX}\langle\top\Omega, exp_{\top\omega}\bot\sigma\rangle \subseteq \bot\omega||_{\bot\sigma}])); [\top\tau \subset_i \vartheta_{\top\omega}\bot\sigma,$
$\text{BEG}\ \bot\sigma <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega||])$

More precisely, in (62i) the modal base of *-galuar* 'rem' is the set of worlds where the speaker is married ($\bot\omega||$). This set includes the real world ($\top\omega$), where the speaker is married at the time of this speech act ($\top\varepsilon$). However, the real world is remote from the speaker's wishes at the beginning of his marriage (BEG $\bot\sigma$). It is also a world where his marriage is childless. This suggests that the real world is sub-optimal *because* the speaker's marriage is childless, i.e. that he would prefer a wife-and-kid world to the real world.

The counterfactual (62ii) makes this explicit. The input modal base is the aforementioned domain (current $\bot\omega_2||$) where the speaker (CTR $\top\varepsilon$) has a wife. The topical hypothesis is the sub-domain where the wished-for ($\bot\sigma_2$-)kid is a son, born (BEG $\bot\sigma$) after the marriage ceremony (BEG $\top\sigma$). This topical sub-domain is remote from the wife-only sub-domain the speaker believes he inhabits. The attitudinal comment is that the speaker's ($\top\varepsilon$-)current wishes in the real world ($\top\omega$) rank any world ($\bot\omega$) in this remote topical sub-domain ($\top\Omega$), where he also has a son, above the real world ($\top\omega$), where he only has a wife.

In the subordinated counterfactual (62iii) the initial modal anaphor ('then') zooms in on the wished-for worlds ($\bot\omega$) and requires the rest of the counterfactual to elaborate ($^{\bot}$;). The antecedent clause introduces the event of the speaker's death, and the subset of worlds where he dies as the topical sub-domain. Since all men are mortal, this subset consists of all of the wished-for worlds. The main attitudinal comment refers to this topical sub-domain ($\top\Omega$). It projects an expected consequence of the speaker's death in this sub-domain, which alas he does not believe he inhabits. In the expected worlds of this remote sub-domain, after the speaker's death the son he wishes he had helps the wife he actually has.

The counterfactual Kennedy discourse (59i, ii) likewise projects an expected consequence in a modality the speaker does not believe to be his, but here viewed from a past perspective point. Temporal reference is analyzed in (63i, ii) (building on (61i, ii)).

(63i) (59i) Kennedy was assassinated because he had many enemies.
Kennedy-^{T} kill-pssv-DEC$_{T}$-3S enemy-many-have-FCT$_{T}$-3S$_{T}$
${}^{\top}[x|\ x =_i jfk]; [e|\ kill_{\top\omega}\langle e, \text{CTR}\ e, \top\delta\rangle, \top\tau \subset_i \vartheta_{\top\omega}\ \text{CON}\ e, e <_{\top\omega} \top\varepsilon]; {}^{\top}[p|\ p = \top\omega||]; [t|\ t$
$=_i \vartheta_{\top\omega}\bot\varepsilon]; [s\ w|\ \text{CTR}\ s =_i \top\delta, many.enemies_w\langle\text{BCK}\ s, \top\delta, \vartheta_w\ s\rangle, \bot\tau \subset_i \vartheta_w\ \text{CON BEG}\ s]$
$; [\top\omega|| \subseteq \bot\omega||]$

(63ii) (59ii) If Oswald hadn't killed him, someone else would've.
Oswald-ERG$^{\perp}$ kill-prf-not-rem-HYP$_{\perp}$-3S$_{\perp}$-3S$^{\perp}$…
$(([x|\, x =_i osw]; [e\, w|\, kill_w\langle e, \perp\delta, \top\delta\rangle]; [s|\, s =_i \text{CON}\, \perp\varepsilon, \top\tau \subset_i \vartheta_{\perp\omega}\, s]; [w|\, w \notin \perp\omega\|_{\top\tau}];$
$[s|\, \text{CTR}\, s =_i \perp\delta, \top\tau \subset_i \vartheta_{\perp\omega}\, s]; [\perp\omega, \top\omega \in \perp\omega_3\|]; [\perp\omega \notin \text{MAX}\{\perp\omega_3\|, bel_{\top\omega}\top\varepsilon\}];$
$[\text{BEG}\perp\sigma_3 <_{\perp\omega} \text{BEG}\perp\sigma]; [\perp\omega \in \perp\omega_3\|]; {}^{\top}[p|\, p = \perp\omega\|])^{\top}; ([x|\, x =_i \top\delta]; \ldots$
… man-bad-other-3S$_{\perp}$-ERG$^{\top}$ kill-prf-exp$^{>}$+rem-DEC$_{\top\perp}$-3S-3S
$\ldots {}^{\top}[x|\, man_{\perp\omega}\langle x, \perp\tau\rangle]; [bad\{\top\delta, \top\delta\|_{\perp\omega}, \perp\tau\}]; [\perp\delta_2 \in \top\delta\|]; [\top\delta \neq_i \perp\delta_2]; [e|$
$kill_{\perp\omega}\langle e, \top\delta, \perp\delta\rangle]; [s|\, s =_i \text{CON}\perp\varepsilon]; [\perp\omega, \top\omega \in \perp\omega_3\|]; [\perp\omega \notin \text{MAX}\{\perp\omega_3\|, bel_{\top\omega}\top\varepsilon\}]$;
$[\text{BEG}\perp\sigma \subset_{\perp\omega} \text{CON BEG}\perp\sigma_4]; [s|\, \text{BEG}\perp\sigma <_{\perp\omega} \text{END}\, s]; [\text{MAX}\langle\top\Omega, exp_{\top\omega}\perp\sigma\rangle \subseteq$
$\perp\omega\|_{\perp\sigma}])); [\top\tau \subset_i \vartheta_{\top\omega}\perp\sigma, \text{BEG}\perp\sigma <_{\top\omega}\top\varepsilon]; {}^{\top}[p|\, p = \top\omega\|]$

In (63i) the declarative clause outputs a common ground ($\top\omega\|$) where JFK's assassination is a ($\top\varepsilon$-)currently verifiable fact. The post-posed factual clause adds another currently verifiable fact as a possible cause—to wit, JFK's enemies reaching critical mass (BEG s). The resulting hate-filled state is realized in a larger class of worlds ($\perp\omega\|$), and in every common ground world ($\top\omega$) the time ($\perp\tau$) of JFK's assassination ($\perp\varepsilon$) falls within the consequent time of the beginning of this hate-filled state ($\vartheta_{\perp\omega}$ CON BEG s).

In this context, the counterfactual (63ii) introduces a ($\top\omega$-)real and ($\top\varepsilon$-)current state of expectation. It projects an expected consequence of the aforementioned event of JFK's enemies reaching critical mass (BEG$\perp\sigma_3$ in the antecedent, BEG$\perp\sigma_4$ in the consequent). The modal base for this expectation is the aforementioned set of worlds where this critical event is realized ($\perp\omega_3\|$). The topical hypothesis introduced by the hypothetical mood is the sub-domain—remote from the sub-domain the speaker believes to be his—where JFK is not assassinated by Oswald. The main attitudinal comment is that within this remote sub-domain ($\perp\Omega$), the worlds that best fit the speaker's current expectations are those where, in the wake of JFK's enemies reaching critical mass, some other bad guy assassinates him.

In summary, Kalaallisut counterfactuals report attitudes to remote modalities. They involve an extra attitude, because the relation of modal remoteness is itself attitudinal. More precisely, the topical antecedent hypothesis and/or the scope of the attitudinal comment are marked as remote (*-galuar* 'rem') from an attitudinal ideal (e.g. beliefs or desires) of a current center of empathy, looking from a secondary perspective point. This secondary attitude report elaborates the main attitudinal comment about the topical antecedent hypothesis.

7. A CCG + UC fragment of Kalaallisut

To complete the analysis, I now show that the proposed UC representations can be derived from Kalaallisut discourse by universal directly compositional rules. To demonstrate that I define a fragment of Kalaallisut—rich enough to derive the counterfactual JFK discourse (59i, ii) and its UC representation (63i, ii)—in a framework that combines UC with the universal rules of Combinatory Categorial Grammar (CCG, Steedman 2000).

In CCG universal rules such as forward and backward function application (>, <) and composition (**>B**, **<B**, **<<B**) combine lexical items into well-formed interpreted strings.

- $X/Y: \beta_{ab} \quad Y: \alpha_{a} \quad \Rightarrow_{>} \quad X: \beta\alpha$
  $Y: \alpha_{a} \quad X\backslash Y: \beta_{ab} \quad \Rightarrow_{<} \quad X: \beta\alpha$
- $X/Y: \beta_{ab} \quad Y/Z: \alpha_{ca} \quad \Rightarrow_{>\mathbf{B}} \quad X/Z: \lambda u_{c}.\ \beta(\alpha u)$
  $Y\backslash Z: \alpha_{ca} \quad X\backslash Y: \beta_{ab} \quad \Rightarrow_{<\mathbf{B}} \quad X\backslash Z: \lambda u_{c}.\ \beta(\alpha u)$
  $(Y\backslash Z)\backslash Z': \alpha_{c'ca} \quad X\backslash Y: \beta_{ab} \quad \Rightarrow_{<<\mathbf{B}} \quad (X\backslash Z)\backslash Z': \lambda u'_{c'} \lambda u_{c'}.\ \beta(\alpha u' u)$

The category s (sentence) is universal, but languages may differ on other categories as well as the category-to-type rule. For Kalaallisut, I propose an inventory of categories defined in K1 on the basis of the universal category sentence (s) plus three types of pronouns: individual (pn_{δ}), modal (pn_{ω}), and temporal (pn_{τ}). The Kalaallisut category-to-type rule K2 requires sentences to translate into UC updates (type [ ] := $(st)st$) and a-pronouns into a-projections (type sa). (Note that types of the form $(a_1\ldots(a_n[]))$ are abbreviated as $[a_1\ldots a_n]$.)

K1 (Kalaallisut categories)
- s and pn_{δ}, pn_{τ}, pn_{ω}, are Kalaallisut categories
- If X and Y are Kalaallisut categories, then so are (X/Y) and $(X\backslash Y)$.

K2 (Kalaallisut category-to-type rule)
- $\mathbf{tp}(\mathrm{s}) = [\ ]$, $\mathbf{tp}(\mathrm{pn}_{a}) = sa$
- $\mathbf{tp}(X/Y) = \mathbf{tp}(X\backslash Y) = (\mathbf{tp}(Y)\ \mathbf{tp}(X))$

ABBREVIATIONS (categories and types)
$\underline{\mathrm{s}} := \mathrm{s}\backslash\mathrm{pn}_{\omega} \quad \mathrm{s}_{a} := \mathrm{s}\backslash\mathrm{pn}_{a} \quad \mathrm{pn} := \mathrm{pn}_{\delta} \quad \mathrm{D} := s\delta \quad \mathrm{W} := s\omega$
$\mathrm{iv} := \underline{\mathrm{s}}\backslash\mathrm{pn}_{\delta} \quad \mathrm{cn}_{a} := (\mathrm{s}_{a}\backslash\mathrm{pn}_{\omega})\backslash\mathrm{pn}_{\tau} \quad \mathrm{cn} := \mathrm{cn}_{\delta} \quad \mathrm{T} := s\tau \quad [\ ] := (st)st$

Kalaallisut has four categories of roots: *intransitive verbs* (iv), *transitive verbs* (iv\pn), *common nouns* (cn_{a}), and *relational nouns* ($\mathrm{cn}_{a}\backslash\mathrm{pn}$). Transitive verbs and relational nouns have an extra argument (object $\underline{y}_{\mathrm{D}}$ or possessor $\underline{z}_{\mathrm{D}}$), so they require an extra pronoun (pn).

die- $\vdash$ iv: $\lambda\underline{x}_{\mathrm{D}}\lambda\underline{w}_{\mathrm{W}}([e]; [die_{\underline{w}}\langle\perp\varepsilon, \underline{x}\rangle])$
kill- $\vdash$ iv\pn: $\lambda\underline{y}_{\mathrm{D}}\lambda\underline{x}_{\mathrm{D}}\lambda\underline{w}_{\mathrm{W}}([e]; [kill_{\underline{w}}\langle\perp\varepsilon, \underline{x}, \underline{y}\rangle])$
man- $\vdash$ cn: $\lambda\underline{t}_{\mathrm{T}}\lambda\underline{w}_{\mathrm{W}}\lambda\underline{x}_{\mathrm{D}}[man_{\underline{w}}\langle\underline{x}, \underline{t}\rangle]$
enemy- $\vdash$ cn\pn: $\lambda\underline{z}_{\mathrm{D}}\lambda\underline{t}_{\mathrm{T}}\lambda\underline{w}_{\mathrm{W}}\lambda\underline{x}_{\mathrm{D}}[enemy_{\underline{w}}\langle\underline{x}, \underline{z}, \underline{t}\rangle]$

Morphologically, verbal roots inflect for mood. Semantically, they introduce eventualities into discourse. In contrast, nominal roots inflect for case. Unlike verbs, they have a temporal argument ($\underline{t}_{\tau}$), which can be saturated by derivation (e.g. *-qar* '-have') or case inflection. The primary (last) argument of a verbal root is the world of evaluation ($\underline{w}_{\mathrm{W}}$). Nominal roots have primary arguments of various types: an individual for $\mathrm{cn}_{(\delta)}$ (e.g. *inuk-* 'man'), a time for cn_{τ} (e.g. *ulluq-* 'day'), or a world for cn_{ω} (e.g. *isuma-* 'idea'). This interacts with lexical recentering, which can help to saturate the primary argument (see lexical recentering operators, $\top(\cdot)$ and $\perp(\cdot)$, below).

Kalaallisut is a polysynthetic language, with hundreds of derivational suffixes. It builds words compositionally, just like English builds sentences. Morphologically complex bases always allow further derivation, because derivational suffixes operate within the space of root categories. That is, a derivational suffix attaches to an input base of a root category and derives an output base of a root category. Kalaallisut *att*-suffixes interact with negative suffixes ('-not', '-rem') in a way similar to English *neg*-raising (Observation 5). I attribute this to additional *neg*-raising entries for negative suffixes (e.g. '+rem'), which enable them to form complex predicates with *att*-suffixes (e.g. ‘-exp$^{>}$+rem’), in effect reversing the relative scope within the complex. (Note that in all lexical entries, $\eta, \eta' \in \{\varepsilon, \sigma\}$.)

-bad $\vdash$ cn\cn: $\lambda\underline{N}_{[\mathrm{TWD}]}\lambda\underline{t}_{\mathrm{T}}\lambda\underline{w}_{\mathrm{W}}\lambda\underline{x}_{\mathrm{D}}.\ \underline{N}\ \underline{t}\ \underline{w}\ \underline{x};\ [\mathit{bad}\{\underline{x}, \underline{x}\|_{\underline{w}}, \underline{t}\}]$
-other $\vdash$ (cn\pn)\cn: $\lambda\underline{N}_{[\mathrm{TWD}]}\lambda\underline{z}_{\mathrm{D}}\lambda\underline{t}_{\mathrm{T}}\lambda\underline{w}_{\mathrm{W}}\lambda\underline{x}_{\mathrm{D}}.\ \underline{N}\ \underline{t}\ \underline{w}\ \underline{x};\ [\underline{z} \in \underline{x}\|];\ [\underline{x} \neq_i \underline{z}]$
-have $\vdash$ iv\(cn\pn): $\lambda\underline{M}_{[\mathrm{DTWD}]}\lambda\underline{x}_{\mathrm{D}}\lambda\underline{w}_{\mathrm{W}}.\ [s|\ \mathrm{CTR}\ s =_i \underline{x}]^{\perp};\ \underline{M}\ \underline{x}\ (\vartheta_{\underline{w}} \perp\sigma)\ \underline{w}\ (\mathrm{BCK} \perp\sigma)$
-pssv $\vdash$ iv\(iv\pn): $\lambda\underline{R}_{[\mathrm{DDW}]}\lambda\underline{x}_{\mathrm{D}}\lambda\underline{w}_{\mathrm{W}}.\ \underline{R}\ \underline{x}\ (\mathrm{CTR} \perp\eta)\ \underline{w}$
-prf $\vdash$ iv\iv: $\lambda\underline{P}_{[\mathrm{DW}]}\lambda\underline{x}_{\mathrm{D}}\lambda\underline{w}_{\mathrm{W}}.\ \underline{P}\ \underline{x}\ \underline{w}^{\perp};\ [s|\ s =_i \mathrm{CON\ EVT} \perp\eta]$
-exp$^{>}$ $\vdash$ $\underline{s}\backslash\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ (\underline{V} \perp\omega^{\perp};\ [\mathrm{EVT} \perp\eta \subset_{\perp\omega} \mathrm{CON}\ ?\varepsilon]);\ [s|\ \mathrm{EVT} \perp\eta <_{\perp\omega} \mathrm{END}\ s];$
$[\mathrm{MAX}\langle \top\Omega, \mathit{exp}_{\underline{w}} \perp\sigma\rangle \subseteq \perp\omega\|_{\perp\sigma}]$
-not $\vdash$ $\underline{s}\backslash\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ (\underline{V} \perp\omega^{\perp};\ [\mathrm{AT}_{\perp\omega}\{\mathrm{STA} \perp\eta, ?\tau\}]);\ ([w]^{\perp};\ [\underline{w} \notin \perp\omega_2\|_{?\tau}];\ [s|$
$\mathrm{CTR}\ s =_i \mathrm{CTR} \perp\eta];\ [\mathrm{AT}_{\underline{w}}\{\perp\sigma, ?\tau\}])$
-rem $\vdash$ $\underline{s}\backslash\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ \underline{V} \perp\omega,\ [\perp\omega, \top\omega \in\ ?\omega\|];\ [\underline{w} \notin \mathrm{MAX}\{?\omega\|, \mathit{att}_{\top\omega}\ ?\varepsilon\}]$
+rem $\vdash$ $\underline{s}\backslash\underline{s}\backslash(\underline{s}\backslash\underline{s})$: $\lambda\underline{F}_{[[\mathrm{W}]\mathrm{W}]}\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{v}_{\mathrm{W}}.\ \underline{F}\ \lambda\underline{w}_{\mathrm{W}}(\underline{V} \perp\omega,\ [\perp\omega, \top\omega \in\ ?\omega\|];\ [\underline{w} \notin \mathrm{MAX}\{?\omega\|,$
$\mathit{att}_{\top\omega}\ ?\varepsilon\}])\ \underline{v}$

Verbal bases inflect for mood. The output is not a root category, so it can only feed into further inflection. The declarative matrix mood (-DEC) asserts that the iv-event (EVT $\perp\eta$) is a currently verifiable fact. It also introduces the updated common ground ($\top\omega\|$) as the new primary topic (the truth-set of the declarative statement). The dependent factual mood (-FCT) introduces a background fact (EVT $\perp\eta'$) which is realized throughout the matrix common ground and may have caused the matrix event (EVT $\perp\eta$). The dependent hypothetical mood (-HYP) forms a modal topic-comment sequence ($^{\mathrm{T}};$) with the verbal base ($\underline{s}$) of the modified verb. The modal topic is the sub-domain of the modal base ($?\omega\|$) where the antecedent prospect, viewed from a salient perspective point ($?\varepsilon$), is realized.

-DEC $\vdash$ s\pn\iv: $\lambda\underline{P}_{[\mathrm{DW}]}\lambda\underline{x}_{\mathrm{D}}.\ (\underline{P}\ \underline{x} \top\omega^{\perp};\ [\mathrm{AT}_{\top\omega}\{\perp\eta, \top\tau\}]);\ [\mathrm{EVT} \perp\eta <_{\top\omega} \top\varepsilon];$
$^{\mathrm{T}}[p|\ p = \top\omega\|]$
-FCT $\vdash$ (s\s)\pn\iv: $\lambda\underline{P}_{[\mathrm{DW}]}\lambda\underline{x}_{\mathrm{D}}\lambda K_{[\,]}.\ ((K^{\perp};\ [t|\ t =_i \vartheta_{\top\omega}\ \mathrm{EVT} \perp\eta])^{\perp};\ (\underline{P}\ \underline{x} \perp\omega^{\perp};$
$[\perp\tau \subset_i \vartheta_{\perp\omega}\ \mathrm{CON\ EVT} \perp\eta']));\ [\top\omega\| \subseteq \perp\omega\|]$
-HYP $\vdash$ $(\underline{s}/\underline{s})$\pn\iv: $\lambda\underline{P}_{[\mathrm{DW}]}\lambda\underline{x}_{\mathrm{D}}\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ ((\underline{P}\ \underline{x} \perp\omega^{\perp};\ [?\varepsilon <_{\perp\omega} \mathrm{EVT} \perp\eta]);$
$[\perp\omega \in\ ?\omega\|];\ ^{\mathrm{T}}[p|\ p = \perp\omega\|])^{\mathrm{T}};\ \underline{V}\ \underline{w}$

The mood inflection is followed by one or two pronominal suffixes (category x\(x\pn), with x $\in \{$s, s\s, s/s, $\underline{s}/\underline{s}$, $\underline{s}\backslash\underline{s}\}$ for subject pronouns). That is why an inflected matrix verb in Kalaallisut is a complete sentence (see Jelinek 1984 on pronominal argument languages). Possessors of relational nouns are likewise saturated by pronominal suffixes. Third person pronouns are either topical or backgrounded. Typically, they are interpreted as top or bottom anaphors that saturate the current argument slot. Alternatively, they may update the centering status of that argument (e.g. in the antecedent of (59ii), the suffix ‘-3S$^{\perp}$’ fills the object slot with the input topic, JFK, and demotes JFK to the status of background.)

-3S$_{\top}$ $\vdash$ x\(x\pn): $\lambda\underline{X}_{[\mathrm{D}\ldots]}.\ \underline{X} \top\delta$
-3S$_{\perp(2)}$ $\vdash$ x\(x\pn): $\lambda\underline{X}_{[\mathrm{D}\ldots]}.\ \underline{X} \perp\delta_{(2)}$
-3S$^{\perp}$ $\vdash$ $(\underline{s}/\underline{s})\backslash((\underline{s}/\underline{s})\backslash\mathrm{pn})$: $\lambda\underline{G}_{[\mathrm{D}[\mathrm{W}]\mathrm{W}]}\lambda\underline{V}_{[\mathrm{W}]}.\ \underline{G} \top\delta\ \lambda\underline{w}_{\mathrm{W}}([x|\ x =_i \top\delta]^{\perp};\ \underline{V}\ \underline{w})$

Nominal bases inflect for case. The direct cases (absolutive and ergative) form s-modifiers. These pseudo ‘subjects’ and ‘objects’ set the topic or background for an anaphoric pronominal suffix, which is the true argument of the predicate in the modified sentence.

$-\varnothing^{\mathrm{T}}$, ERG$^{\mathrm{T}}$ $\vdash$ (s/s)\cn: $\lambda \underline{N}_{[\mathrm{TWD}]}\lambda K_{[\,]}.\ \underline{N}\ ?\tau ?\omega \top \delta^{\mathrm{T}}; K$
$-\varnothing^{\perp}$, ERG$^{\perp}$ $\vdash$ (s/s)\cn: $\lambda \underline{N}_{[\mathrm{TWD}]}\lambda K_{[\,]}.\ \underline{N}\ ?\tau ?\omega \perp \delta^{\perp}; K$

Kalaallisut is topic-prominent and polysynthetic. I attribute these typological traits partly to lexical entries, such as the above, and partly to lexical *recentering* (${}^{\mathrm{T}}(\cdot), {}^{\perp}(\cdot)$) and *type lifting* ($(\cdot)^{+}$, ${}^{+}(\cdot)$). Type lifting by $(\cdot)^{+}$ turns s-modifiers (s/s) into verbal base modifiers ($\underline{\text{s}}/\underline{\text{s}}$), whereas ${}^{+}(\cdot)$ makes verbal bases ($\underline{\text{s}}$) accessible to word-external modifiers.

${}^{\mathrm{T}}(\cdot)$ $\vdash$ $\mathrm{s}_a\backslash\mathrm{s}_a$: $\lambda P_{[sa]}\, \lambda \underline{u}_{sa}.\ {}^{\mathrm{T}}[u_a]\ {}^{\mathrm{T}}; P\, \underline{u}$ $a \in \mathrm{DR}(\Theta)$
${}^{\perp}(\cdot)$ $\vdash$ $\mathrm{s}_a\backslash\mathrm{s}_a$: $\lambda P_{[sa]}\, \lambda \underline{u}_{sa}.\ [u_a]\ {}^{\perp}; P\, \underline{u}$ $a \in \mathrm{DR}(\Theta)$
$(\cdot)^{+}$ $\vdash$ ($\underline{\text{s}}/\underline{\text{s}}$)\(s/s): $\lambda \underline{K}_{[[\,]]}\lambda \underline{V}_{[\mathrm{W}]}\lambda \underline{w}_{\mathrm{W}}.\ \underline{K}\ (\underline{V}\ \underline{w})$
${}^{+}(\cdot)$ $\vdash$ (iv\($\underline{\text{s}}/\underline{\text{s}}$))\iv: $\lambda \underline{P}_{[\mathrm{DW}]}\lambda \underline{F}_{[[\mathrm{W}]\mathrm{W}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{W}}.\ \underline{F}\ (\underline{P}\ \underline{x})\ \underline{w}$

In this fragment, discourse (59i, ii) can be derived as follows. Complex words are incrementally built and translated into UC by universal rules of backward application and composition (<, <**B**, and ≪**B**). For example, sentence (59i) consists of three words, which are built in (64a) and (65a); the resulting translations (b) are equivalent to (c). Words are then combined, incrementally left-to-right, into sentences. For discourse (59i, ii) the two component sentences are built in (64)–(66) and (67)–(73), respectively.

```
(64) a. Kennedy-                 ^T(·)    -Ø^T          kill-    -pssv          -DEC_T     -3S
        _______________          _____    _______       _____    ________       _______    _____
        cn (= s_δ\pn_ω\pn_τ)     s_δ\s_δ  (s/s)\cn      iv\pn    iv\(iv\pn)     s\pn\iv    s\(s\pn)
        ___________________________ ≪B                  _______________________ <
        cn                                              iv
        ___________________________________________ <   _______________________________ <
        s/s                                             s\pn
                                                        ______________________________________________ <
                                                        s
        ______________________________________________________________________________________________ >
        s
```

b. $({}^{\mathrm{T}}[x]\ {}^{\mathrm{T}}; [\top \delta =_i jfk])\ {}^{\mathrm{T}}; ((([e]; [kill_{\mathrm{T}\omega}\langle \perp \varepsilon, \text{CTR} \perp \varepsilon, \top \delta\rangle])\ {}^{\perp}; [\text{AT}_{\mathrm{T}\omega}\{\text{EVT} \perp \varepsilon, \top \tau\}]);$
$[\text{EVT} \perp \varepsilon <_{\mathrm{T}\omega} \top \varepsilon]; {}^{\mathrm{T}}[p \mid p = \top \omega \|])$

c. ${}^{\mathrm{T}}[x \mid x =_i jfk]; [e \mid kill_{\mathrm{T}\omega}\langle e, \text{CTR}\ e, \top \delta\rangle, \top \tau \subset_i \vartheta_{\mathrm{T}\omega}\ \text{CON}\ e, e <_{\mathrm{T}\omega} \top \varepsilon]; {}^{\mathrm{T}}[p \mid p = \top \omega \|]$

(65) a. enemy- -many -have $^{\perp}(\cdot)$ -FCT$_{\mathrm{T}}$ -3S$_{\mathrm{T}}$
———— ———— ———— ———— ———— ————
cn\pn cn\cn iv\(cn\pn) $s_{\omega}\backslash s_{\omega}$ (s\s)\pn\iv (s\s)\((s\s)\pn)
———————— **<B**
cn\pn
———————————— <
iv (:= s_{ω}\pn)
————————————————— **<B**
iv
—————————————————————— <
(s\s)\pn
———————————————————————————— <
s\s

b. $\lambda K_{[]}.\ ((K\,^{\perp};\ [t|\ t =_i \vartheta_{\mathrm{T}\omega}\ \mathrm{EVT}\ \perp\varepsilon])\,^{\perp};\ ((([w]\,^{\perp};\ ([s|\ \mathrm{CTR}\ s =_i \top\delta]\,^{\perp};\ [\mathit{many.enemies}_{\perp\omega}$
$\langle\mathrm{BCK}\ \perp\sigma, \top\delta, \vartheta_{\perp\omega}\ \perp\sigma\rangle]))\,^{\perp};\ [\perp\tau \subset_i \vartheta_{\perp\omega}\ \mathrm{CON\ EVT}\ \perp\sigma]));\ [\top\omega\| \subseteq \perp\omega\|]$

c. $\lambda K_{[]}.\ (K\,^{\perp};\ [t|\ t =_i \vartheta_{\mathrm{T}\omega}\ \perp\varepsilon]);\ [s\ w|\ \mathrm{CTR}\ s =_i \top\delta, \mathit{many.enemies}_w\langle\mathrm{BCK}\ s, \top\delta, \vartheta_w\ s\rangle,$
$\perp\tau \subset_i \vartheta_w\ \mathrm{CON\ BEG}\ s];\ [\top\omega\| \subseteq \perp\omega\|]$

(66)(64) (65) $\Rightarrow_{<}$ s: (63i)

(67)($^{\perp}$ (Oswald)-ERG$^{\perp}$)$^{+}$ $\vdash$ $\underline{s}/\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ [x|\ x =_i \mathit{osw}]\,^{\perp};\ \underline{V}\ \underline{w}$

(68)$^{+}$($^{\perp}$ (kill))-prf-not-rem-HYP$_{\perp}$-3S$_{\perp}$-3S$^{\perp}$ $\vdash$ $(\underline{s}/\underline{s})\backslash(\underline{s}/\underline{s})$: $\lambda\underline{F}_{[[\mathrm{W}]\mathrm{W}]}\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ (((\underline{F}\ \lambda\underline{v}_{\mathrm{W}}([w]\,^{\perp};$
$[e|\ \mathit{kill}_{\underline{v}}\langle e, \perp\delta, \top\delta\rangle])\ \perp\omega);\ [s|\ s =_i \mathrm{CON}\ \perp\varepsilon, \top\tau \subset_{\perp\omega} s];\ [w|\ w \notin \perp\omega\|_{\mathrm{T}\tau}];\ [s|\ \mathrm{CTR}\ s =_i$
$\perp\delta, \top\tau \subset \vartheta_{\perp\omega}\ s];\ [\perp\omega, \top\omega \in \perp\omega_3\|];\ [\perp\omega \notin \mathrm{MAX}\{\perp\omega_3\|, \mathit{bel}_{\mathrm{T}\omega}\top\varepsilon\}];\ [\mathrm{BEG}\ \perp\sigma_3 <_{\perp\omega}$
$\mathrm{BEG}\ \perp\sigma];\ [\perp\omega \in \perp\omega_3\|];\ ^{\mathrm{T}}[p|\ p = \perp\omega\|])\,^{\mathrm{T}};\ ([x|\ x = \top\delta]\,^{\perp};\ \underline{V}\ \underline{w}))$

(69)(67) (68) $\Rightarrow_{<}$ $\underline{s}/\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ ([x|\ x =_i \mathit{osw}];\ [e\ w|\ \mathit{kill}_w\langle e, \perp\delta, \top\delta\rangle];\ [s|\ s =_i \mathrm{CON}\ \perp\varepsilon,$
$\top\tau \subset_i \vartheta_{\perp\omega}\ s];\ [w|\ w \notin \perp\omega\|_{\mathrm{T}\tau}];\ [s|\ \mathrm{CTR}\ s =_i \perp\delta, \top\tau \subset_{\perp\omega} s];\ [\perp\omega, \top\omega \in \perp\omega_3\|];\ [\perp\omega$
$\notin \mathrm{MAX}\{\perp\omega_3\|, \mathit{bel}_{\mathrm{T}\omega}\top\varepsilon\}];\ [\mathrm{BEG}\ \perp\sigma_3 <_{\perp\omega} \mathrm{BEG}\ \perp\sigma];\ ^{\mathrm{T}}[p|\ p = \perp\omega\|])\,^{\mathrm{T}};\ ([x|\ x =_i \top\delta]\,^{\perp};$
$\underline{V}\ \underline{w})$

(70)($^{\mathrm{T}}$(man-bad-other-3S$_{\perp 2}$)-ERG$^{\mathrm{T}}$)$^{+}$ $\vdash$ $\underline{s}/\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ ((^{\mathrm{T}}[x|\ \mathit{man}_{\perp\omega}\langle x, \perp\tau\rangle];\ [\mathit{bad}\{\top\delta,$
$\top\delta\|_{\perp\omega}, \perp\tau\}];\ [\perp\delta_2 \in \top\delta\|];\ [\top\delta \neq_i \perp\delta_2])\,^{\mathrm{T}};\ \underline{V}\ \underline{w})$

(71) (69) (70) $\Rightarrow_{>\mathbf{B}}$ $\underline{s}/\underline{s}$: $\lambda\underline{V}_{[\mathrm{W}]}\lambda\underline{w}_{\mathrm{W}}.\ ([x|\ x =_i \mathit{osw}];\ [e\ w|\ \mathit{kill}_w\langle e, \perp\delta, \top\delta\rangle];\ [s|\ s =_i \mathrm{CON}\ \perp\varepsilon,$
$\top\tau \subset_i \vartheta_{\perp\omega}\ s];\ [w|\ w \notin \perp\omega\|_{\mathrm{T}\tau}];\ [s|\ \mathrm{CTR}\ s =_i \perp\delta, \top\tau \subset \vartheta_{\perp\omega}\ s];\ [\perp\omega, \top\omega \in \perp\omega_3\|];\ [\perp\omega$
$\notin \mathrm{MAX}\{\perp\omega_3\|, \mathit{bel}_{\mathrm{T}\omega}\top\varepsilon\}];\ [\mathrm{BEG}\ \perp\sigma_3 <_{\perp\omega} \mathrm{BEG}\ \perp\sigma];\ ^{\mathrm{T}}[p|\ p = \perp\omega\|])\,^{\mathrm{T}};\ ([x|\ x =_i \top\delta]\,^{\perp};$
$((^{\mathrm{T}}[x|\ \mathit{man}_{\perp\omega}\langle x, \perp\tau\rangle];\ [\mathit{bad}\{\top\delta, \top\delta\|_{\perp\omega}, \perp\tau\}];\ [\perp\delta_2 \in \top\delta\|];\ [\top\delta \neq_i \perp\delta_2])\,^{\mathrm{T}};\ \underline{V}\ \underline{w}))$

(72)$^{+}$(kill-prf-exp$^{>}$+rem)-DEC$_{\mathrm{T}\perp}$-3S-3S $\vdash$ $s\backslash(\underline{s}/\underline{s})$: $\lambda\underline{F}_{[[\mathrm{W}]\mathrm{W}]}.\ ((\underline{F}\ \lambda\underline{w}_{\mathrm{W}}([e|\ \mathit{kill}_{\perp\omega}\langle e, \top\delta, \perp\delta\rangle,$
$[s|\ s =_i \mathrm{CON}\ \perp\varepsilon];\ [\perp\omega, \top\omega \in \perp\omega_3\|];\ [\perp\omega \notin \mathrm{MAX}\{\perp\omega_3\|, \mathit{bel}_{\mathrm{T}\omega}\ \top\varepsilon\}];\ [\mathrm{BEG}\ \perp\sigma \subset_{\perp\omega}$
$\mathrm{CON\ BEG}\ \perp\sigma_4];\ [s|\ \mathrm{BEG}\ \perp\sigma <_{\perp\omega} \mathrm{END}\ s];\ [\mathrm{MAX}\langle\top\Omega, \mathit{exp}_{\underline{w}}\ \perp\sigma\rangle \subseteq \perp\omega\|_{\perp\sigma}])\ \top\omega);\ [\top\tau$
$\top_i\ \vartheta_{\mathrm{T}\omega}\ \perp\sigma, \mathrm{BEG}\ \perp\sigma <_{\mathrm{T}\omega} \top\varepsilon];\ ^{\mathrm{T}}[p|\ p = \top\omega\|]$

(73)(71) (72) $\Rightarrow_{<}$ s: (63ii)

In general, a Kalaallisut sentence consists of a saturated matrix verb (category s or type-lifted s\($\underline{s}/\underline{s}$)) plus any number of dependents, interpreted as modifiers ($\underline{s}/\underline{s}$, s/s, or s\s). Most dependents precede the matrix verb, but one or two may be post-posed (as in (66)). Multiple dependents on the same side of the matrix verb compose (by **>B** or **<B**) into a dependent cluster (as in (71)), which then combines with the matrix verb like a single dependent (by > or <, as in (73)). This left-to-right incremental analysis correctly predicts one more typological trait of Kalaallisut—to wit, the ‘free’ order of the dependents of a matrix verb. All of the example discourses in sections 1–6 can be incrementally composed in this way. Thus, the proposed UC representations can be derived from Kalaallisut discourse by universal directly compositional rules of CCG.

8. From Kalaallisut to English

Typologically, Kalaallisut is a mood-based topic-prominent language with massively polysynthetic morphology and ‘free’ word order. At the other extreme, English is a tense-based subject-prominent language with analytic morphology and rigid word order. As a consequence, none of the Observations 1–6 about the syntax-semantics interface extend to English. Unlike Kalaallisut, English has no fact-oriented mood, no prospect-oriented hypothetical mood, no prospect-oriented attitudinal correlate requirement, and no translation equivalent for the remoteness suffix *-galuar* ‘rem’.

Nevertheless, I propose that in English, too, reference to real and hypothetical past, present, and future involves centering-based modal and temporal anaphora. This proposal builds on a CCG + UC fragment of English presented in Bittner (2009), which implements an influential theory of tense as temporal anaphora (Partee 1973, 1984) plus temporal update (Webber 1988). Here, I also implement a version of Stone’s (1997) idea that, in addition to anaphoric tenses, English has a parallel system of anaphoric modals. As in Kalaallisut, universal CCG rules translate English discourses into UC. For instance, discourse (74i, ii) translates into (75i, ii), given lexical entries exemplified below. (Note that unlike Kalaallisut, which employs a global update, $[\mathrm{AT}_W\{A, T\}]$, English uses a local condition, $\mathrm{AT}_W\langle A, T\rangle := \lambda j_s((\mathrm{EVT}\ Aj = Aj \rightarrow \vartheta_{Wj}\, Aj \subset Tj) \wedge (\mathrm{STA}\ Aj = Aj \rightarrow Tj \subset \vartheta_{Wj} Aj))$.)

(74)i. Jim leaves today.
ii. Sue will be upset.

leave- $\vdash \underline{\mathrm{s}}\colon \lambda \underline{w}_{\mathrm{W}}.\ [e|\ leave_{\underline{w}}\langle e, \mathrm{CTR}\ e\rangle]$

-TNS$_{\geq}$ $\vdash$ $\mathrm{iv}\backslash\underline{\mathrm{s}}\colon \lambda \underline{V}_{[\mathrm{W}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{W}}.\ [\vartheta_{\top\omega}\top\varepsilon \leq_i \top\tau];\ [\underline{w} \in \top\omega|];\ (\underline{V}\ \underline{w}\ {}^{\perp};\ [\mathrm{AT}_{\underline{w}}\langle\perp\eta, \top\tau\rangle,$
$\mathrm{CTR}\ \perp\eta =_i \underline{x}])$

FUT $\vdash$ $\mathrm{iv}/\underline{\mathrm{s}}_{\emptyset}\colon \lambda \underline{V}_{[\mathrm{W}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{W}}.\ [\vartheta_{\top\omega}\top\varepsilon <_i \top\tau];\ [\underline{w} \in \top\omega|];\ (\underline{V}\ \underline{w}\ {}^{\perp};\ [\mathrm{AT}_{\underline{w}}\langle\perp\eta, \top\tau\rangle,$
$\mathrm{CTR}\ \perp\eta =_i \underline{x}])$

Jim $\vdash$ $\underline{\mathrm{s}}/\mathrm{iv}\colon \lambda \underline{P}_{[\mathrm{DW}]}\lambda \underline{w}_{\mathrm{W}}.\ {}^{\mathrm{T}}[x|\ x =_i jim]\ {}^{\mathrm{T}};\ \underline{P}\ \top\delta\ \underline{w}$

today$_{\eta}$ $\vdash$ $\mathrm{iv}\backslash\mathrm{iv}\colon \lambda \underline{P}_{[\mathrm{DW}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{W}}.\ \underline{P}\ \underline{x}\ \underline{w}\ {}^{\perp};\ [\vartheta_{\underline{w}}\perp\eta \subseteq day.of\langle\vartheta_{\top\omega}\top\varepsilon\rangle]$

$(\cdot)^{\mathrm{T}\tau}$ $\vdash$ $\mathrm{iv}\backslash\mathrm{iv}\colon \lambda \underline{P}_{[\mathrm{DW}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{D}}.\ \underline{P}\ \underline{x}\ \underline{w}\ {}^{\perp};\ {}^{\mathrm{T}}[t|\ t \subseteq_i \vartheta_{\underline{w}}\ \mathrm{CON}\ \perp\varepsilon]$

${}^{\mathrm{T}\tau}(\cdot)$ $\vdash$ $\mathrm{iv}\backslash\mathrm{iv}\colon \lambda \underline{P}_{[\mathrm{DW}]}\lambda \underline{x}_{\mathrm{D}}\lambda \underline{w}_{\mathrm{D}}.\ {}^{\mathrm{T}}[t]\ {}^{\mathrm{T}};\ \underline{P}\ \underline{x}\ \underline{w}$

. $\vdash$ $\mathrm{s}\backslash\underline{\mathrm{s}}\colon \lambda \underline{V}_{[\mathrm{W}]}.\ \underline{V}\ \top\omega;\ {}^{\mathrm{T}}[p|\ p = \top\omega|]$

(75)i. Jim $({}^{\mathrm{T}\tau}(\text{leave-}\textsc{tns}_{\geq}))^{\mathrm{T}\tau}$ $\text{today}_{\varepsilon}$ **.**
$^{\mathrm{T}}[x|\ x =_i jim]$; $^{\mathrm{T}}[t|\ \vartheta_{\mathrm{T}\omega}\top\varepsilon \leq_i t]$; $[\top\omega \in \top\omega\|]$; $[e|\ leave_{\mathrm{T}\omega}\langle e,\ \top\delta\rangle,\ \vartheta_{\mathrm{T}\omega}\ e \subset_i \top\tau,$
$\vartheta_{\mathrm{T}\omega}\ e \subseteq_i day.of\langle \vartheta_{\mathrm{T}\omega}\top\varepsilon\rangle]$; $^{\mathrm{T}}[t|\ t \subseteq_i \vartheta_{\mathrm{T}\omega}\,\mathrm{CON}\perp\varepsilon]$; $^{\mathrm{T}}[p|\ p = \top\omega\|]$

ii. Sue FUT be-Ø upset **.**
$^{\mathrm{T}}[x|\ x =_i sue]$; $[\vartheta_{\mathrm{T}\omega}\top\varepsilon <_i \top\tau]$; $[\top\omega \in \top\omega\|]$; $[s|\ upset_{\mathrm{T}\omega}\langle s,\ \top\delta\rangle,\ \top\tau \subset_i \vartheta_{\mathrm{T}\omega}\ s]$;
$^{\mathrm{T}}[p|\ p = \top\omega\|]$

I assume that the discourse-initial default state is universal (${}^{st}\langle \mathrm{p}_0,\ \mathrm{e}_0\rangle$, defined in D7, implementing the 'commonplace effect' of Stalnaker 1978). In particular, the default topic time is the speech *instant* ($\vartheta_{\mathrm{T}\omega}\top\varepsilon$). Since this cannot properly include anything, a topical future *period* must be introduced in (75i) (by ${}^{\mathrm{T}\tau}(\cdot)$), to satistfy the local AT-condition and the non-past tense ($\text{-}\textsc{tns}_{\geq}$). The event of Jim's arrival is properly included within this topical future. In addition, tense on an event verb may update the topic time to the consequent time (by $(\cdot)^{\mathrm{T}\tau}$), as in (75i). This temporal update does not affect post-verbal modifier *today*, which constrains the eventuality (Jim's arrival), not the topic time. In English, illocutionary force is in part marked by prosody. The full stop prosody ('**.**') turns a sentence radical ($\underline{\mathrm{s}}$) into a declarative sentence (s), by predicating the radical of the topic world ($\top\omega$) and introducing the updated common ground ($\top\omega\|$) as the new primary topic (adapting Stalnaker 1975). On this analysis, the indicative is not a fact-oriented mood, but a modal default.

The salient reading of (74ii) is explicated in (75ii). The future auxiliary *will* requires a future topic time and a *vivid* world of evaluation, i.e., a world within the common ground ($\top\omega\|$, adapting Stone 1997). In (75ii) both of these tests are passed, by the topical future following Jim's departure ($\top\tau$) and the topic world ($\top\omega$). In the common ground worlds that survive the assertion of (75ii) Sue is sad at that topical future time. Thus, in root clauses *will* does not involve any modal quantification. All that matters is the actual future of the speech world ($\top\omega$, adapting Kamp/Reyle 1993, who only consider this world).

In contrast, in conditionals *will* quantifies over branching futures (adapting Thomason 1984), because the complementizer *if* builds a modal topic-comment sequence. The antecedent of *will* introduces a topical set of vivid futures and *will*, as part of the comment, quantifies over this set. English *if* does not require any attitudinal correlate because it is itself implicitly attitudinal (cf. Kratzer 1981), unlike the hypothetical mood in Kalaallisut.

if $\vdash$ $(\underline{\mathrm{s}}/\underline{\mathrm{s}})/\underline{\mathrm{s}}$: $\lambda \underline{V}_{[\mathrm{w}]}\lambda \underline{V}'_{[\mathrm{w}]}\lambda \underline{w}_{\mathrm{w}}.((\underline{V}\perp\omega,\ {}^{\mathrm{T}}[p|\ p = \perp\omega\|])^{\mathrm{T}};\ (\underline{V}'\perp\omega,\ [\mathrm{MAX}\langle\top\Omega,\ att_{\underline{w}}\ ?\varepsilon\rangle \subseteq$
$\perp\omega\|_{?\varepsilon}])))$

For example, the conditional variant of discourse (74i, ii) translates into (76). The non-past antecedent (*if Jim leaves*…) introduces a topical sub-domain of the common ground ($\top\omega\|$, adapting Stalnaker 1975), where Jim leaves at a future topic time (introduced by ${}^{\mathrm{T}\tau}(\cdot)$, as in (75i)). The topical future for the attitudinal comment is the consequent time of this event (introduced by $(\cdot)^{\mathrm{T}\tau}$, as in (75i)). The attitudinal comment (…*Sue will be upset*) is analyzed as a prediction, i.e., the implicit attitude of *if* is resolved to expectation (*exp*) and the perspective point, to the speech act ($\top\varepsilon$). In the antecedent worlds that best fit the speaker's expectations Sue is sad at that future time, i.e. in the wake of Jim's departure.

(76) $^{\perp}$if Jim $(^{\top\tau}(\text{leave-}\textsc{tns}_{\geq}))^{\top\tau} \ldots$
$([w]\ ^{\perp}; ((^{\top}[x|\ x =_i jim];\ ^{\top}[t|\ \vartheta_{\top\omega}\top\varepsilon \leq_i t];\ [\perp\omega \in \top\omega\|];\ [e|\ leave_{\perp\omega}\langle e, \top\delta\rangle,\ \vartheta_{\perp\omega}\, e \subset_i \top\tau];\ ^{\top}[t|\ t \subseteq_i \vartheta_{\perp\omega}\ \text{CON}\ \perp\varepsilon];\ ^{\top}[p|\ p = \perp\omega\|])\ ^{\top}; \ldots$
… Sue FUT be-Ø upset (if) **.**
$\ldots\ (^{\top}[x|\ x =_i sue];\ [\vartheta_{\top\omega}\ \top\varepsilon <_i \top\tau];\ [\perp\omega \in \top\omega\|];\ [s|\ upset_{\perp\omega}\langle s, \top\delta\rangle,\ \top\tau \subset_i \vartheta_{\perp\omega}\, s];\ [\text{MAX}\langle\top\Omega, exp_{\top\omega}\top\varepsilon\rangle \subseteq \perp\omega\|_{\top\varepsilon}])));\ ^{\top}[p|\ p = \top\omega\|]$

Unlike Kalaallisut, English marks remoteness from attitudinal ideals (e.g. from the most desirable worlds, in the context of (77i)) by a variety of means, e.g. 'fake past' in the antecedent and a future-oriented remote modal in the matrix (as in (77ii), see Iatridou 2000, Condoravdi 2002).

(77) i. I want Jim to win tomorrow.
ii. If he lost, Sue {would | might} get upset.

Iatridou (2000) shows that past tense marking is used in this way in unrelated languages all over the world, so it cannot be chance. She proposes that past tense can indicate either that 'the topic time excludes the utterance time' (p. 246) or that 'the topic worlds exclude the actual world' (p. 247). This proposal is both too weak (not now does not mean past) and too strong (undesirable does not mean not actual, alas), but the basic idea is attractive. Building on that, I propose that past tense ($_{<}$TNS) requires *precedence*—either the topic time precedes the perspective time in the temporal order, or the world of evaluation precedes (ranks below) the perspective world in a salient attitudinal order. The latter reading may be forced by a future-oriented modal that likewise requires remoteness (e.g. FUT$_{rem}$ or MAY$_{rem}$).

-$_{<}$TNS ⊢ $\text{iv}\backslash\underline{\text{s}}: \lambda\underline{V}_{[\text{W}]}\lambda\underline{x}_{\text{D}}\lambda\underline{w}_{\text{W}}.\ [\top\tau <_i \vartheta_{\top\omega}\top\varepsilon];\ [\underline{w} \in \top\omega\|];\ (\underline{V}\ \underline{w}\ ^{\perp};\ [\text{AT}_{\underline{w}}\langle\perp a, \top\tau\rangle, \text{CTR}\ \perp a =_i \underline{x}])$
⊢ $\text{iv}\backslash\underline{\text{s}}: \lambda\underline{V}_{[\text{W}]}\lambda\underline{x}_{\text{D}}\lambda\underline{w}_{\text{W}}.\ [att_{\top\omega}\ ?\varepsilon\!: \underline{w} < ?\omega];\ [\underline{w} \in \top\omega\|];\ (\underline{V}\ \underline{w}\ ^{\perp};\ [\text{AT}_{\underline{w}}\langle\perp a, ?\tau\rangle, \text{CTR}\ \perp a =_i \underline{x}])$
FUT$_{rem}$ ⊢ $\text{iv}/\underline{\text{s}}_{\emptyset}: \lambda\underline{V}_{[\text{W}]}\lambda\underline{x}_{\text{D}}\lambda\underline{w}_{\text{W}}.\ [\vartheta_{\top\omega}?\varepsilon <_i ?\tau];\ [\underline{w} \notin \text{MAX}\{\top\omega\|, att_{\top\omega}\ ?\varepsilon\}];\ (\underline{V}\ \underline{w}\ ^{\perp};\ [\text{AT}_{\underline{w}}\langle\perp a, ?\tau\rangle, \text{CTR}\ \perp a =_i \underline{x}])$
MAY$_{rem}$ ⊢ $\text{iv}/\underline{\text{s}}_{\emptyset}: \lambda\underline{V}_{[\text{W}]}\lambda\underline{x}_{\text{D}}\lambda\underline{w}_{\text{W}}.\ [\vartheta_{\top\omega}?\varepsilon <_i ?\tau];\ [\underline{w} \notin \text{MAX}\{\top\omega\|, att_{\top\omega}?\varepsilon\}];\ ((^{\top}[p|\ p \subseteq \perp\Omega];\ [\underline{w} \in \top\Omega])\ ^{\top};\ (\underline{V}\ \underline{w}\ ^{\perp};\ [\text{AT}_{\underline{w}}\langle\perp a, ?\tau\rangle, \text{CTR}\ \perp a =_i \underline{x}]))$

On this analysis of 'fake past' and future-oriented remote modals, discourse (77i, ii) translates into (78i, ii). In the output of (78i) throughout the common ground ($\top\omega\|$), the speaker is in a current state of desire whose modal base is the initial common ground (default $\top\Omega$). In the top-ranked ($\top\Omega$-)worlds Jim wins the day after this speech act ($\top\varepsilon$-tomorrow). In the follow-up conditional (78ii), the topical antecedent hypothesis is the less desirable sub-domain, relative to the winning worlds ($\perp\omega_2$), where Jim loses the aforementioned ($\perp\tau$-)competition. The topic time for the matrix comment is the consequent time of that defeat. This topical future ($\top\tau$) and the remote hypothetical worlds ($\perp\omega$) satisfy the tests of the matrix modal (*would* or *might*). If the modal is *would*, then the main attitudinal comment is that, within the antecedent modality where Jim loses (current $\top\Omega$), in the worlds the speaker considers most likely Sue gets upset during the consequent time of Jim's defeat. If the modal is *might*, then this holds for a non-empty sub-domain of the antecedent losing modality.

(78) i. I want$_{\bot}$-TNS$_{\geq}$ Jim$^{\bot}$ INF win-Ø tomorrow$_{\varepsilon}$.
$[\vartheta_{\top\omega}\top\varepsilon \leq_i \top\tau]; [\top\omega \in \top\omega\|]; [x|\ x =_i jim]; [e\ w|\ win_w\langle e, \bot\delta\rangle, \vartheta_w\ e \subseteq_i day.after$
$\langle\vartheta_{\top\omega}\top\varepsilon\rangle]; [s\ t|\ \vartheta_{\bot\omega}\ \bot\varepsilon \subset_i t, \vartheta_{\bot\omega}\ \mathrm{BEG}\ s <_i t]; [\mathrm{MAX}\langle\top\Omega, des_{\top\omega}\ \bot\sigma\rangle \subseteq \bot\omega\|_{\bot\sigma}];$
$[\top\tau \subset_i \vartheta_{\top\omega}\ \bot\sigma, \mathrm{CTR}\ \bot\sigma =_i \mathrm{CTR}\ \top\varepsilon]; {}^{\top}[p|\ p = \top\omega\|]$

ii. $^{\bot}$if he (lose-$_{<}$TNS)$^{\top\tau}$ …
$([w]\ ^{\bot}; ([des_{\top\omega}\top\varepsilon\text{:}\ \bot\omega < \bot\omega_2]; [\bot\omega \in \top\omega\|]; [e|\ lose_{\bot\omega}\langle e, \bot\delta\rangle, \vartheta_{\bot\omega}\ e \subset_i \bot\tau];$
${}^{\top}[t|\ t \subseteq_i \vartheta_{\bot\omega}\ \mathrm{CON}\ \bot\varepsilon]; {}^{\top}[p|\ p = \bot\omega\|])\ ^{\top}; \ldots$
… Sue FUT$_{rem}$ get-Ø upset (if) .
$\ldots ({}^{\top}[x|\ x =_i sue]; [\vartheta_{\top\omega}\top\varepsilon <_i \top\tau]; [\bot\omega \notin \mathrm{MAX}\{\top\omega\|, des_{\top\omega}\top\varepsilon\}]; [e|\ upset_{\bot\omega}$
$\langle\mathrm{CON}\ e, \top\delta\rangle, \vartheta_{\bot\omega}\ e \subset_i \top\tau]; [\mathrm{MAX}\langle\top\Omega, exp_{\top\omega}\top\varepsilon\rangle \subseteq \bot\omega\|_{\top\varepsilon}])); {}^{\top}[p|\ p = \top\omega\|]$
… Sue MAY$_{rem}$ get-Ø upset (if) .
$\ldots ({}^{\top}[x|\ x =_i sue]; [\vartheta_{\top\omega}\top\varepsilon <_i \top\tau]; [\bot\omega \notin \mathrm{MAX}\{\top\omega\|, des_{\top\omega}\top\varepsilon\}]; {}^{\top}(([p|\ p \subseteq_i \top\Omega]$
$[\bot\omega \in_i \top\Omega])\ ^{\top}; ([e|\ upset_{\bot\omega}\langle\mathrm{CON}\ e, \top\delta\rangle, \vartheta_{\bot\omega}\ e \subset_i \top\tau]; [\mathrm{MAX}\langle\top\Omega, exp_{\top\omega}\top\varepsilon\rangle$
$\subseteq \bot\omega\|_{\top\varepsilon}]))); {}^{\top}[p|\ p = \top\omega\|]$

On this analysis, conditionals are a species of attitude reports not only in Kalaallisut but also in English, albeit with different details. This proposal is admittedly less compelling for English than for Kalaallisut, but it is compatible with some influential English-based theories of attitudes as well as indicative and counterfactual conditionals (e.g. the theories cited above). Some seemingly conflicting claims about English (e.g. Thomason 1984 vs. Kamp/Reyle 1983 on the future *will*) are reconciled as context-dependent special cases of this cross-linguistic proposal. This proposal also explains the widespread use of 'fake past' in remote conditionals, by extending the standard theory of past tense as temporal precedence to a parallel theory of remoteness as attitudinal precedence.

A general point illustrated by this cross-linguistic study is that languages may fundamentally disagree on grammatical means, like Kalaallisut and English on all the major typological traits. Therefore, they may disagree on observations about the syntax-semantics interface, like Kalaallisut and English on all of the Observations 1–6. Such systematic differences may amount to genuinely different grammatical systems for discourse reference to real and hypothetical past, present, and future.

English, with its parallel system of anaphoric tenses and modals, treats time and modality as two essentially independent dimensions. Eventualities are located at a certain time in a certain set of worlds. Accordingly, English-based theories of temporal reference generally treat it as independent of modal reference and vice versa. In contrast, the mood-based system of Kalaallisut is centered around the notion of a *currently verifiable fact* from the perspective of a certain event. That event (e_0) is located in some world at some time and to be currently verifiable from that perspective means to precede that event in *time* in the same *world* ($e <_w e_0 := [[\vartheta]]\,(w)(e) <_\tau [[\vartheta]]\,(w)(e_0)$). In this system it is possible to analyze modal reference independently of temporal reference, as we have done throughout this study. However, the analysis of temporal reference must first of all explicate the relevant perspectival discourse referents. And then it must necessarily build on modal reference to locate the related currently verifiable facts as well as current prospects, i.e. events that may become currently verifiable facts in some modality, viewed from a future perspective point.

Nevertheless, if we take each language at face value and interpret it exactly as is, then we may find that even languages with fundamentally different grammatical systems still agree on semantic universals. For example, even Kalaallisut and English agree on the basic ontology of individuals, times, events, states, and worlds, and on centering-based discourse anaphora across these semantic domains. As a consequence, by different grammatical means, both languages converge on similar truth conditions for discourses about real and hypothetical past, present, and future, which both languages treat as centering-based discourse anaphora to individuals, times, events, states, and worlds.

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Katharina Haude

Tense Marking on Dependent Nominals in Movima[1]

1. Introduction

In Movima, an endangered, unclassified language of the Bolivian Amazon area, tense is not marked on verbs, but on dependent nominals. Consider the difference between (1), where the temporal interpretation is context-dependent, and (2), where past tense is indicated by the form of the neuter article.[2]

(1) kay-a:-poj **as** pa:ko
feed-DR-CAUS ART.N dog
'I fed/feed/will feed the dog.'[3]

(2) kay-a:-poj **os** pa:ko
feed-DR-CAUS ART.N.P dog
'I fed the dog.'

The different temporal interpretations of (1) and (2) result from the fact that, as will be described in detail below, the article *as* in (1) indicates that the referent of the noun phrase is present at the speech situation, while *os* in (2) indicates that the referent does not exist anymore. In other words, the noun phrase marks a temporal distinction, a phenomenon that can be described as "nominal tense marking" (Nordlinger/Sadler 2004).

The paper is structured as follows. In section 2, I present some basic features of Movima clause structure (2.1.) and show that Movima does not have verbal tense-marking morphology (2.2.), tense, aspect and mood (TAM) categories being encoded by particles (2.3.). I will then give an account of the system of referential elements, in particular, the article (section 3). It will be shown how the Movima article indicates spatial and temporal properties of concrete referents (3.1.), how a three-way temporal distinction is made on noun phrases referring to times and events (3.2.), and how noun phrases referring to absolute concepts are immune to temporal marking (3.3.). In section 4, I discuss the notions of propositional and independent nominal tense marking with regard to the Movima article: while it encodes the temporal properties of entities, and hence functions independently of the clausal tense, the form of the article by implicature determines the temporal interpretation of the clause as well (4.1.). Moreover, the article can serve to mark temporal reference in discourse not only implicitly, but also directly (4.2). It is postulated that the article gradually shifts from an independent to a propositional tense marker (4.3.). In section 5, I briefly address some problems related to the concept of nominal tense marking.

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[1] This paper is a slightly extended version of Haude (2010b) and was prepared within the Movima documentation project of the DoBeS programme (Volkswagenstiftung). I am grateful to the Movima speakers who taught me their language, in particular to the ones who contributed the examples presented here: Esaltación Amblo, Julia Malale, Balvina Almaquio, Eligardo Chirimani, Etelvina Gualusna, Griselda Cáumol, Herlan Rojas. I furthermore wish to thank Albert Ortmann and an anonymous reviewer for very helpful comments on a previous version of the manuscript.

[2] Abbreviations in the glosses are: A=absential; ANT=anterior; APPL=applicative; ART=article; BE=bound nominal element; BR=bound root; CAUS=causative; DEM=demonstrative; DR=direct; DUR=durative; DSC=discontinuous; EV=evidential; F=feminine; HAB=habitual; INAL=inalienable; IMM=immediate past; IMP=imperative; INTR=intransitive; IRR=irrealis; ITN=intentional; LV=linking vowel; M=masculine; MD=middle; MLT=multiple; MOD=modal; N=neuter; NMZ=nominalization; NSTD=nonstanding; OBL=oblique; P=past; PL=plural; PRO=free pronoun; REL=relativizer; REM=remote past; R/R=reflexive/reciprocal; SG=singular; STD=standing. The symbol -- represents "external cliticization", which marks the obviative argument and contrasts phonologically with "internal cliticization" (represented as =), which marks the proximate argument (see Haude 2006: 97ff.; Haude 2009b). The symbols ~ for reduplication and < > for infixation stem from the Leipzig Glossing Rules.

[3] The first person singular is not overtly marked on transitive verbs and possessed nominals.

The data on which the analysis is based were collected in Santa Ana del Yacuma, Bolivia, between 2001 and 2004. Most of the data presented here stem from spontaneous discourse (marked with [tx]), the rest is elicited.

2. The lack of verbal tense morphology

2.1. Basic features of Movima clause structure

The core of a Movima clause is typically predicate initial. Arguments are represented by bound or free pronouns or by noun phrases, which consist of an article and a content word. Example (3) illustrates a transitive clause, which consists of a predicate and two noun phrases (in square brackets) representing the arguments.[4]

(3)	man<a>ye=[is	pa:ko]	[os	rulrul]
	encounter<DR>=ART.PL	dog	ART.N.P	jaguar

‘The dogs met the/a jaguar.’ [tx]

Adjuncts are marked by the oblique case marker *n-*, as illustrated in the intransitive clause in (4):[5]

(4)	ilo:ni--y’Ki	**n**-os	chapmo
	walk--1PL	OBL-ART.N.P	forest

‘We walked in the forest.’ [tx]

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[4] The article of the first argument phrase in a transitive clause is cliticized phonologically to the predicate (see Haude 2009b).

[5] The cliticization processes mark as -- (“external cliticization”) applies to pronouns representing the single argument of intransitive clauses and the obviative argument of transitive clauses. It contrasts with “internal cliticization” (=), which marks the proximative argument of transitive clauses (see Haude 2009b).

The content word in a noun phrase can be a morphological noun, as in the above examples, but it can also be a verb, in which case the phrase refers to a participant in the event. In turn, a content word that is not preceded by an article, but for example accompanied by a pronoun, is automatically interpreted as a predicate (see Haude 2009a). Compare the noun phrase in (5a) with the predicate in (5b), both headed by the word *pa:toronay'Ki* 'our landlord':

(5) a. kus pa:toron-a=y'Ki
ART.M.A landlord-LV=1PL
'our landlord' [tx]
b. usko pa:toron-a=y'Ki
PRO.3M.A landlord-LV=1PL
'He (is/was) our landlord.' [tx]

The examples in (6) illustrate the same contrast with a morphological verb, yeynan 'you want' (see Haude 2010a for discussion):

(6) a. is yey-na=n
ART.PL want-DR=2
'the ones you want(ed)' [tx]
b. i'ko yey-na=n
PRO.3PL want-DR=2
'You want(ed) those.' [tx]

Thus, noun phrases can contain nouns as well as verbs, but in either case, they establish reference.[6] While perhaps not fully adequate, I use the term "noun phrase" because functionally, reference is a nominal property (Croft 2003), and the categories encoded by the article can be considered nominal.

2.2. The lack of verbal tense morphology

Movima has no verbal tense marking morphology. Depending on the context, the clause in (7) can either have a past, present, or future interpretation.

(7) yolmoK--isne
stroll--3F.A
'She (absent) went / is going / will go for a walk.'

The only verbal affix that can have a temporal reading is the irrealis infix *<(k)ak>*.[7] In affirmative contexts, it indicates that the speaker believes that the situation will take place some time in the future:

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[6] As can be seen in (6), an NP containing a verb refers to an event participant. In the case of event- or state-denoting NPs, an explicit morphological nominalizer is used (see 3.2).

[7] This morpheme is inserted after the first iambic foot of the base. It appears with an initial /k/ after vowels (see Haude 2006: 78ff.).

(8)	sal**<ak>**mo
	return<IRR>

‘I’ll be back!’ [tx]

Aspect affixes in Movima cover meanings such as “repeatedly” or “at once”. None of them locates the denoted situation temporally. On the whole, the major TAM categories are expressed through particles, most of which are not formally related to the verb. I will give an outline of the relevant particles in the following section.

2.3. TAM particles

Movima has a large array of particles and adverbs that express temporal, modal, and aspectual categories. Temporal relations are mainly established by the following ones:

(9)	*kwil*	a long time ago
	la’	the previous occurrence of the event (always before the day of speaking)
	kwey	on the same day, but before the time of speaking
	loy	directly after the time of speaking or a future reference time
	nokowa	after the time of speaking

As will also become apparent below (section 3.2.), the major temporal categories in Movima are “past” (before the day of speaking), “immediate past” (on the same day, but before the time of speaking), and non-past. Accordingly, the above particles can be grouped into two forms pertaining to the past (*kwil* and *la’*), one that pertains to the immediate past (*kwey*), and two that pertain to non-past (*loy* and *nokowa*).

The following examples illustrate the way in which these particles convey temporal meanings. Examples (10) and (11) illustrate the particles *kwil* and *la’*. They occur frequently inside an NP (i.e., between the article and the following content word), which shows that they are not syntactically part of the verb phrase.

(10)	n-os	**kwil**	bayłim-a=y’łi	rey	mo:
	OBL-ART.N.P	REM	field-LV=1PL	MOD	yet
	maj<ak><ni:~>ni				
	my_child<IRR><NMZ~>				

‘On our field, long ago, I didn’t have children yet.’ [tx]

(11)	jo’yaj--us	n-os	**la’**	walaylo
	arrive--3M.A	OBL-ART.N.P	ANT	afternoon

‘He arrived yesterday afternoon.’ (lit.: “on the previous afternoon.”) [tx]

The “immediate past” particle *kwey* usually occurs before the predicate, as in (12), but it can also occur inside an NP, as shown in (13):

(12)	**kwey**	joy-cheł	us	pa:pa=kinos	majni
	IMM	go-R/R	ART.M	father_of=ART.F.A	my_child
	n-as	ra:diyo			
	OBL-ART.N	radio			

‘The father of my daughter went to the radio (station) earlier today.’ [tx]

(13) no-kos **kwey** łu:vuy jayna kiro' joy-cheł
OBL-ART.N.A IMM dawn DSC DEM.PL.A go-R/R
'They had left today at dawn already.' [tx]

The occurrence of the particle *nokowa* outside and inside a noun phrase is illustrated by (14) and (15), respectively:

(14) n-as tojeł-wa=as piyesta **nokowa**
OBL-ART.N pass-NMZ=ART.N fiesta right_now
jiwa- łe-na=y' łi rey
come-APPL-DR=1PL MOD
When the fiesta is over we will bring (her) again.' [tx]

(15) di:ra łat koro' kos **nokowa** piyesta
still EV DEM.N.A ART.N.A right_now fiesta
'There will still be a fiesta, they say.' [tx]

The TAM particle *loy* is the only one that never occurs inside a noun phrase, but normally right before the predicate, as in (16).[8]

(16) jayna **loy** rey it joy-cheł ma'
DSC ITN MOD 1INTR go-R/R my_mother
'I'm already leaving again, mother.' [tx]

None of these particles is grammatically obligatory. For example, the particle la', which indicates the previous occurrence of a situation, is not needed to indicate past tense in general. The phrase nos walaylo 'in the afternoon' in (17) also refers to an afternoon in the past (as indicated by the article os, see section 3 below), but it is not specified as the previous afternoon, as was the case in 0 above.

(17) lassinko os joyaj-wa=i, n-os walaylo
five_o'clock ART.N.P arrive-NMZ=3PL OBL-ART.N.P afternoon
'At five o'clock (was) their arrival, in the afternoon.' [tx]

Likewise, the particle *kwey* is not obligatory in contexts that refer to a time on the day of speaking, as is the case of (18) (see section 3.2 below for the 'immediate past' interpretation of the absential article *kos*):

(18) jayna kino' chi:~chi no-kos ima:yoj
DSC DEM.F.A MD~go_out OBL-ART.N.A morning
'She has gone out (today) in the morning.' [tx]

The particles *loy* and *nokowa* are not obligatory markers of future tense either. The pair in (19) shows that *loy* is not obligatory:

(19) a. n-as sot-tino:na' **loy** ił sal-na
OBL-ART.N other-year ITN 1 search-DR
'Next year I will look for (you).'

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[8] Inside an NP, the particle *loy* is a marker of negation.

b. n-as sot-tino:na' ił sal-na
OBL-ART.N other-year 1 search-DR
'Next year I will look for (you).'

Example (20) is comparable in structure with (14) above. Here, however, future reference is made without the particle nokowa.[9]

(20) n-as vakasyon ... it joy-cheł n-as
OBL-ART.N holiday 1INTR go-R/R OBL-ART.N
vayeK-wa n-iy'bikweł
see-NMZ OBL-PRO.2PL
'In the holidays [...] I'll go to see you.' [tx]

In texts, the TAM particles only occur to establish the time of the topic of discourse, typically at the beginning of a text or passage (see, for instance, (10) above). Once the discourse time has been established, the particle does usually not occur again. For example, in the discourse preceding the sentence in (17) above, the discourse time had been established as the previous day.

3. Spatio-temporal reference

Despite the fact that there is no verbal tense morphology in Movima and that the TAM particles are not grammatically obligatory, sentences like those in (17)–(20) above do contain temporal information. In (17), it is asserted that the described situation has occurred in the past, i.e. before the day of speaking. Example (18) is unambiguously interpreted as describing a situation that has occurred on the same day, but previous to the moment of speaking. Examples (19) and (20) clearly refer to a nonpast time. These meanings are brought about by the form of the article of one or more noun phrases in the clause. This mechanism is described in this and the following sections.

Movima has a rich inventory of referential elements: personal pronouns, articles, and demonstratives. They all have highly specific deictic properties, always indicating number, gender, and presence or absence of the referent. For absent referents, articles (but not pronouns, and demonstratives only in restricted contexts) additionally indicate whether the referent is still in existence or whether it has ceased to exist. This property makes the article the main carrier of temporal information in Movima. Its forms are given in Table 1.

Table 1. The Movima article

	masculine	feminine	neuter	plural
presential	*us*	*i'nes*	*as*	*is*
absential	*kus*	*kinos*	*kos*	*kis*
"past"	*us (usos)*	*isnos*	*os*	*is (isos)*

---

[9] Depending on the context, this clause can also have a habitual meaning: '... I always come to see you' (see 3.2.).

The article is defined by the fact that it is obligatorily followed by a content word, together with which it forms an NP. It does not mark definiteness, which is usually inferred from the context. For explicit definite reference to an entity present at the speech situation, a demonstrative can be used (which also indicates visibility, position, and relative distance; see Haude 2006: 174ff.). For explicit definite reference to an entity absent from the speech situation, the deictic adverb *ney* 'here' is placed right after the article:

(21) ma'nes kis **ney** nonlo:-ba
tasty ART.PL.A here milk-BR.round
'Those milk cakes are tasty.' [tx]

The following sections elaborate on the temporal-deictic function of the article.

3.1. Concrete referents: presence, absence, ceased existence

To start with, consider the examples in (22):

(22) a. **as** pa:ko
ART.N dog
'the dog'
b. **kos** pa:ko
ART.N.A dog
'the/a dog (absent)'
c. **os** pa:ko
ART.N.P dog
'the/a dog (past)'

The NP in (22a), with the presential neuter article *as*, is used for reference to a dog that is present near the speech situation, for example in sight or somewhere in the same house or compound. It can also have a generic meaning, referring to the species of dogs.[10] The NP in (22b), with the absential article *kos*, refers to a dog that exists somewhere else, but is not near the speech situation. The NP in (22c), which contains the "past" article, is used to refer to a dog that by the time of speaking has ceased to exist (see section 4.2 below for further elaboration). The article thus distinguishes two temporal categories: existence (present or absent) and ceased existence.

It can be seen in Table 1 that only the neuter and the feminine articles distinguish formally between presence, absence, and ceased existence. By contrast, in the masculine and the plural paradigm, the same form is used for present and for non-existing referents (*us* for masculine and *is* for plural; the forms in brackets, *usos* and *isos*, are very rare and, according to speaker judgements, imply that the referents have ceased to exist a long time ago). These forms are best seen as homophonous morphemes with different meanings: when the referent is absent, the forms *us* or *is* automatically imply ceased existence, since otherwise, the absential absential forms *kus* or *kis* would be used. (The unmarked article *is* in (3) above, for instance, is used because the dogs referred to did not exist anymore at the time of speaking.)

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[10] It is because of this broader applicability of the presential article (see also section 3.2.) that it is unmarked in the glossing.

In order to apply the past article, the referent must be conceived of as having ceased to exist completely. It cannot be used to refer to dead bodies or to objects that have simply lost their function (a common function of nominal tense marking in other languages; see Nordlinger/Sadler 2004): the referent must be physically "gone". Otherwise, the presential or absential article is used. Example (23) illustrates this for a glass that is broken, but whose remainders are still around; (24) shows it for a person that has died, but whose body is still in existence (at the time of the actual utterance, it is being taken to the cemetery; note that the adjunct phrase refers to the event of dying, not to the dead person; see section 3.2).

(23) bay<a>cho=us **as** wa:so
break<DR>=3M.A ART.N glass
'He (absent) has broken the (present) glass.'

(24) **kinos** senyo:ra jala:yij n-os kayni-wa=sne
ART.F.A señora angry OBL-ART.N.P die-NMZ=3F.A
'The (absent) woman was angry when she died.' (lit.: "in her past dying") [tx]

Likewise, the past article does not indicate that a possessive relation has ended, while the possessum still exists. Hence, it is not equivalent to nominal temporality markers such as the English prefix *ex-*, which indicates a loss of function or termination of a possessive relation, but not that the referent itself has ceased to exist.

A further condition for the applicability of the past article is that the referent must have ceased to exist before the day of speaking. When it has ceased to exist on the same day, then inevitably the absential article is used (25a), and the past article would be ungrammatical (25b); its adequate employment is illustrated in (25c).

(25) a. kwey it kay~kay no-**kos** jokme
IMM 1 INTR MD~eat OBL-ART.N.P bird
'Today I ate the/a chicken.'
b. kwey it kay~kay *n-**os** jokme
IMM 1 INTR MD~eat OBL-ART.N.P bird
c. la' je:mes it kay~kay n-**os** jokme
ANT day 1 NTR MD~eat OBL-ART.N.P bird
'Yesterday I ate the/a chicken.'

While the Movima past article asserts that the referent has ceased to exist before the day of speaking, there is no such marker for future existence, as in some other languages with nominal tense marking like Guaraní (see Tonhauser, this volume). For entities that come into existence in the future, either the presential or the absential article is used (the conditions of choice are not yet clear):

(26) loy ił ji:sa:-na **kis** lokro
ITN 1 make-DR ART.PL.A stew
'I'll make stew.'

(27) loy ił jisa:-na **is** narasa:-mi
ITN 1 make-DR ART.PL orange-BR.water
'I'll make orange juice.'

3.2. Times and situations: a three-way temporal distinction

The temporal-deictic function of the article is still more differentiated in NPs that refer to times (i.e., points in time or time spans) and situations (events, processes, states etc.). These NPs always contain the neuter article. Times are denoted by nouns such as *je:mes* 'day', *walaylo* 'afternoon' or *tino:nak* 'year'. NPs referring to situations contain derived nouns. The nominalizing suffix *-wa* derives event-denoting nouns, and reduplication or suffixation of *-niwa* basically derive state-denoting nouns. Situation-denoting NPs are extremely common in Movima because they are used to form complement and adverbial clauses.

With time- and situation-denoting NPs, all three forms of the article (presential, absential, past) receive a temporal interpretation. The presential article is used in present (28), future (29), and habitual (30) contexts:

(28)	jayna	tojeK	po:la	**as**	salmo-wa=nkweK
	DSC	very	late	ART.N	return-NMZ=2PL

'You (pl) are coming back very late.'
(lit.: "Your returning is very late.") (Context: addressees are just coming back) [tx]

(29)	n-**as**	sot-tino:nak	loy	ił	sal-na
	OBL-ART.N	other-year	ITN	1	search-DR

'Next year I will look for (you).' [tx]

(30)	jampa	inKa	chot	n-**as**	kay-wa
	do_like	PRO.1SG	HAB	OBL-ART.N	eat-NMZ

'I always do like this when I eat.' (lit.: "... at my eating.") [tx]

The absential article indicates that the time or situation has occurred earlier on the same day, as is the case of (31) (partly repeated from (18) above; see also (13) above) and (32). (The absential demonstrative *kino'* in (31) and the masculine article *kus* in (32) are used because the persons referred to are absent; they do not have a temporal implication.)

(31)	jayna	kino'	chi:~chi	no-**kos**	ima:yoj
	DSC	DEM.F.A	MD~go_out	OBL-ART.N.A	morning

'She (absent) has gone out (today) in the morning.' [tx]

(32)	kwey	it	ji<wa~>wa	no-**kos**	sa~sal-wa
	IMM	1INTR	come<MD~>	OBL-ART.N.A	DR~search_for-NMZ
	kus	Ernan	Cholima		
	ART.M.A	E.	Ch.		

'I came earlier today to look for Ernan Cholima.'

The past article indicates that the time or situation has occurred before the day of speaking, as in (33) (partly repeated from (17) above) and (34). (The ending *ł* instead of *s* on the article in (34) marks the first person possessor; see Haude 2006: 141, 228.)

(33)	lassinko	**os**	joyaj-wa=i
	five_o'clock	ART.N.P	arrive-NMZ=3PL

'At five o'clock (was) their arrival.' [tx]

(34) n-**oł** dichi<ye:~>ye toł manes-pa:-na
OBL-ART.N.P.1 child<NMZ~> very tasty-APPL-DR
as tadoy-ni
ART.N sweet-PRC
‘When I was a child, oh dear how much I liked sweets.’ [tx]

The three-way temporal distinction with phrases referring to times and situations can be explained by the fact that these are abstract concepts that, unlike concrete entities, do not have a spatial location (see also Haude 2006: 169f.). Therefore, the absential article can unambiguously be used for temporal instead of spatial deixis.

At the same time, there is a direct parallel with NPs denoting concrete entities, whose referent must have ceased to exist in order to be referred to with the past article. In the case of times and situations, the absential and past forms can be used only when the situation is concluded. A situation that has started in the past but is going on in the present is always referred to with the presential article:

(35) jayna rey kaw-tinonak **as** rey ney-niwa=y’Ki
DSC MOD much-year ART.N MOD here-NMZ=1PL
‘It is many years already that we are here.’ [tx]

Its function in time- and situation-denoting NPs shows that the article distinguishes three major tense categories (like the particles discussed in section 2.3.): past (before the day of speaking), immediate past, and nonpast. A closer observation of the examples in section 2.3. above (in particular, (10), (11), (13), and (14)) reveals that the form of the article in this type of NP coincides with the TAM particle that establishes the time of the context.

3.3. Absolute concepts: no spatio-temporal differentiation

Certain NPs do not participate in the three-way distinction of deictic reference, but generally contain the presential article. These NPs refer to concepts that are highly time-stable, do not change location, and are assumed to be generally known. I refer to these concepts as “absolute concepts”, since their identifiability does not depend on their spatial and temporal location relative to the speech situation.[11] Geographical locations (36), institutional buildings (37), and personalities of religious worship (38) are concepts of this type (again, the *K* on the article in (38) marks the first-person possessor):

(36) bo rey isne kino’ n-**as** Tirinra
because MOD PRO.3F.A DEM.F.A OBL-ART.N Trinidad
‘Because she (absent) is in Trinidad.’ [tx]

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[11] They constitute a subclass of Löbner’s (1985) “functional concepts”, which “exist independently of the particular situation referred to” (Löbner 1985: 279). However, in addition to being considered as independently identifiable, absolute concepts are fixed in space and time, and this is what determines the choice of the unmarked article.

(37) łek-ka-ye:-cheł ena' nosdé n-**as** ele:siya
kick-MLT-BE.Person-R/R DUR.STD over_there OBL-ART.N church
'They are kicking each other over there at the church.' (speaker is at home, far from the church) [tx]

(38) **uł** pa:pa=n n-as ari:wa che
ART.M.1 father_of=2 OBL-ART.N top and
i'neł ma:ma=n di' ma:ma=u
ART.F.1 mother_of=2 REL mother_of=3M
'our (incl.) father up there and our (incl.) mother, who is his mother (i.e. Jesus and Mary) [tx]

A similar case is generic reference, which is also carried out with the presential form (see 3.1. above). Consider (39) (as well as the phrase *as tadoyni* 'sweets' in (34) above):

(39) kilmo **is** itila:kwa
mischievous ART.PL man
'Men are wicked!' [tx]

NPs referring to habitually occurring times and situations, which also contain the presential article (see 0 above), can be considered as belonging to this class as well.

4. Independent and propositional nominal tense marking in Movima

4.1. Independent nominal tense marking with an implicature effect

In their cross-linguistic study on nominal tense marking, Nordlinger/Sadler (1994) argue that there are two types of nominal tense marking: either the nominal tense marker indicates temporal properties of the entity denoted by the nominal, or it determines the temporal interpretation of the entire proposition, similar to tense marking on verbs. In the first case, the marking of temporality on the nominal is independent from clausal tense, which is why Nordlinger and Sadler label it "independent nominal tense marking". In the second case, called "propositional nominal tense marking", the marking of temporality on the nominal contributes temporal information relevant to the clause as a whole.

The spatio-temporal marking on noun phrases in Movima is clearly a case of "nominal tense marking". In line with Nordlinger and Sadler's criteria, the article marks a temporal relation between the existence of the referent and the moment of speaking. The combination with different forms of the article is not restricted to particular types of content words (except perhaps those words that denote "absolute concepts", see section 3.3.). The temporal marking clearly involves dependent phrases, not predicate nominals. And when a noun phrase contains not a noun, but a verb (see (6a) above), it still has a concrete referent, whose spatio-temporal properties are indicated by the article. I will now turn to the question of whether we are dealing with the "independent" or the "propositional" type of nominal tense marking here.

The previous sections have shown that the spatio-temporal deictic properties of the article indicate properties of the referent in relation to the time and place of the utterance. The deictic categories can vary, depending on the type of referent (concrete entity vs. time/situation). They are summed up in Table 2.

Table 2. The spatio-temporal categories encoded by the article

	entity	**time/situation**
presential	present “absolute”	present future “absolute” (habitual)
absential	absent, in existence	concluded earlier on the same day
“past”	absent, out of existence (before the day of speaking)	concluded before the day of speaking

It can be concluded that Movima nominal tense marking is of the “independent” type: it locates the time at which the property denoted by the noun holds of the referent. That this is independent of the contextual tense is shown by the following examples, to be discussed below:

(40) ajlomaj**-ti** **os** naye-wa=n
tell_about-IMP.DR ART.N.P marry-NMZ=2
‘Tell (her) about your (past) marriage!’ [tx]

(41) **loy** it to’baycho-poj-cheK n-**isnos** nonok
ITN 1INTR remember-CAUS-R/R OBL-ART.F.P my_grandparent
‘I’ll remember my late grandmother.’

(42) **a’ko** rey łała<kwa~>kwa=**os** dokwe
PRO.3N MOD seam<INAL~>=ART.N.P my_dress
‘This (a stitched strip of cloth) is the seam of my (former) dress (which does not exist anymore).’

The clauses in (40)–(42) all contain an NP with a past article, but they also contain a marker that rules out a clausal past-tense interpretation. In (40), this is the transitive imperative suffix (*-ti*); (41) contains a TAM particle implying future reference (*loy*, see section 2.3. above), and the referential elements in (42) indicate a difference in temporal properties of possessor and possessee (the presential pronoun *a’ko* for the possessum, the past article for the possessor). In all three examples, the past article indicates ceased existence of the referent, but this is independent of the interpretation of the clause as a whole. These examples, therefore, clearly identify the past article as a marker of independent nominal tense.

However, except in cases like these, which contain elements that explicitly indicate nonpast tense, the past article always determines the interpretation of the entire clause. This could already be observed in (1) and (2) above, repeated in (43) (with the absential construction in (43b) added).

(43) a. kay-a:-poj **as** pa:ko
eat-DR-CAUS ART.N dog
'I fed/am feeding/will feed the dog (present).'
b. kay-a:-poj **kos** pa:ko
eat-DR-CAUS ART.N.A dog
'I fed/will feed the/a dog (absent).'
c. kay-a:-poj **os** pa:ko
eat-DR-CAUS ART.N.P dog
'I fed the/a dog (that is now dead and gone).'

The past interpretation of a clause like (43c) can be understood easily, since it is most common to talk in a past context about entities that have ceased to exist. If the article only indicated loss of function or possession, such as *ex-* or *former* in English, we would expect to find it used more frequently in nonpast contexts, as well. Thus, we are dealing here with independent nominal tense marking that has an effect on the temporal interpretation of the proposition. So far, this is an effect of implicature only and should not be considered tense marking (see Comrie 1985).

However, even though implicational, the article provides temporal information consistently throughout the discourse. This is mainly due to the fact that in Movima, subordination is carried out through nominalization, which derives nouns whose referents are highly sensitive for temporal location (see section 3.2.). This effect can be observed in (44a-c) (note that the existence and presence of the fence, *as chakdi*, remains constant):

(44) a. jayna it ba:lomaj n-**as** ji:sa-na:-wa as chakdi
DSC 1INTR finish OBL-ART.N make-DR-NMZ ART.N fence
'I'll finish making the (present) fence.' (lit.: "with my making the fence")
(I'm still building it)
b. jayna it ba:lomaj no-**kos** ji:sa-na:-wa as chakdi
DSC 1INTR f inish OBL-ART.N.A make-DR-NMZ ART.N fence
'I just finished making the (present) fence.' (today)
c. jayna it ba:lomaj n-**os** ji:sa-na:-wa as chakdi
DSC 1INTR finish OBL-ART.N.P make-DR-NMZ ART.N fence
'I finished making the (present) fence.' (before today)

Still, while the propositional tense-marking effect of the article is to a large extent due to implicature, there are signs that the article also has the potential of indicating propositional tense directly, as the following section will demonstrate.

4.2. The article as a marker of propositional tense

In the previous sections I have shown how the article indicates the location and existence of its referent. However, this was a slight simplification of the facts. First of all, it has to be kept in mind that a speaker cannot always know for sure whether an absent discourse referent is still in existence or not. The choice of the article only reflects the speaker's assumptions to that effect.

Second, also in Movima it does often not really matter whether an entity still exists or not. In fact, entities that are not relevant to the speaker at the time of speaking are generally referred to with the past article in past-tense contexts, independently whether they still exist or not. Typically, inanimate objects, like the car in (45), are referred to with the past article in past-tense contexts, even though they may still be existing somewhere (the situation narrated in (45) had only taken place on the previous day):

(45) jayna lista da' n-os
DSC ready DUR.NSTD OBL-ART.N.P
arrive-NMZ=ART.N.P car DSC
'She was ready when the car arrived.' [tx]

Example (46) illustrates the use of the past article with reference to a spider that has explicitly not been killed and may thus still be alive. However, here, as in (45) above, the past article is used because what is relevant to the speaker is to maintain temporal reference in discourse, and not the possible ongoing existence of the spider:

(46) kas rey tikoy-na:-wa--as,
NEG MOD kill-DR-NMZ--3N.A
os si:wa merek
ART.N.P spider big
'I didn't kill it, the big spider.' [tx]

In past contexts, even NPs referring to living human beings can contain the past article. This is also the case when the person referred to is not relevant for the speaker at the time of speaking. This is the case in (47):

(47) jayna baw<a>ra='ne **os** itila:kwa nokodé
DSC pay<DR>=3F ART.N.P man over_there
'She has already paid the/a man over there.'[12] [tx]

In contrast, living humans that still play a role in the life of the speaker are normally referred to by the presential (48) or absential (49) article (depending on their location), even if the narrated situations have occurred a long time ago:

(48) n-os to<chi~>chik-a=**'nes** majni
OBL-ART.N.P little<NMZ~>-LV=ART.F my_child
as-na=y' Ki n-as Peru
sit-DR=1PL OBL-ART.N Peru
'When my (present) daughter was little (lit.: "at the (past) being small of my (present) daughter"), we lived in El Perú.' [tx]

(49) **kinos** ay'ku beyka n-os choy rey
ART.F.A my_aunt poor OBL-ART.N.P really MOD
tolkos<ya~>ya=sne …
girl<NMZ~>=3F.A
'My poor (absent) aunt, when she was a girl…' [tx]

However, sometimes the past article is used (by some speakers apparently more often than by others) even when the nominal referent is present at the speech situation or when its existence is relevant for the speaker. For instance, in (50) the speaker refers to her own body with the past article, something which is not normally done. In (51), the speaker's parents are referred to with the past article (which, in the case of the masculine, is the unmarked form *us*), even though shortly before it had been pointed out that they are still alive. The article is chosen here not according to a deictic property of the referent, but according to the time of the context.

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[12] With human referents, the neuter article has a nonspecific or derogatory reading.

(50)	jayna	n-os	imayni	jayna	tivijni
	DSC	OBL-ART.N.P	night	DSC	hurt
	os	chodo:wi			
	ART.N.P	my_stomach			

'Then at night, my stomach hurt.' [tx]

(51)	n-asko	ela-na=**us**	pa'
	OBL-PRO.3N.A	leave_behind-DR=ART.M	my_father
	isnos	ma'	
	ART.F.P	my_mother	

'At that (time) my father left my mother.' (both absent, but alive) [tx]

These examples show that the choice of the article is not only determined by properties of the referent, thereby having an implicational effect on the temporal interpretation of the proposition. It can also serve as a device for directly marking temporal relations in discourse. Here, the Movima article is clearly a marker of propositional nominal tense.

4.3. From independent to propositional nominal tense

I have shown that in principle, nominal tense marking in Movima is of the independent type, the choice of the article depending on deictic properties of the referent and having only an implicational effect on the temporal interpretation of the clause. However, depending on the relevance of the referent and on the priority the speaker may give to the marking of discourse tense, the past article can also be used to mark discourse tense directly, thereby functioning as a marker of propositional nominal tense. It is therefore possible to speak of a gradual shift of nominal tense marking in Movima from purely independent towards propositional. This can be represented as in Figure 1:

independent	⟶		**propositional**
property of referent	ceased existence of referent implies past tense in discourse	absent referent whose existence is irrelevant: marking according to context	past article marks past tense in discourse

Figure 1. The shift from independent to propositional nominal tense marking

In Figure 1, prototypical independent nominal tense marking is given on the left-hand side. Here, a temporal property of the referent is marked, independently of the discourse tense (see (40)-(42) above). The fact that this marking usually has an effect on the interpretation of the proposition as a whole (as shown in (43) and (44)) is a step towards propositional temporal marking. When entities are referred to by the past form, even though they are still in existence (as in (45)-(47)) and even present or relevant to the speaker (as in (50)-(51)), the article does not indicate a temporal property of the referent anymore. It serves as a propositional nominal tense marker that provides temporal information of the clause as a whole. This shift can be seen as an instance of what Traugott has termed the "subjectification" effect in grammaticalization (Traugott 1995, 1999): the article is used to express the speaker's attitude towards the propositional content, and through conventionalization of this use, the article grammaticalizes into a marker of propositional tense.

5. Discussion

It was shown that Movima displays the phenomenon Nordlinger/Sadler (2004) label "nominal tense marking". However, it is worth discussing in how far this phenomenon can be seen as tense marking at all, comparable to verbal tense marking in other languages, or if we are not rather dealing with something different.

First of all, it may be asked whether the Movima article does not have the function of indicating aspect or mood rather than tense. The fact that an entity must have ceased to exist completely or that a situation needs to be concluded so that the past article can be applied, points to a possible analysis as an aspect rather than a tense marker. However, as was shown, the article serves to locate situations in time in relation to another time (the moment of speaking). Of the categories tense, mood, and aspect, only tense has this property (see Chung/Timberlake 1985). That there are aspectual categories involved is no contradiction: the correlation between past tense and completive aspect is due to the fact that a situation ongoing at the speech moment has not been completed. Modal categories may be part of the meaning of the article in that the perspective of the speaker is crucial, sometimes regardless of the actual or ceased existence of the referent.[13] However, the article does not seem to qualify the proposition as a whole in these cases.

A further question is whether the category of tense can be applied to nominal expressions at all. Tonhauser (2006) argues that from a semantic viewpoint, verbal tense and the temporal interpretation of NPs are fundamentally different. It would, therefore, be more appropriate to speak about nominal temporality rather than about tense. This issue is worth considering in some detail.

In addition to being a nominal category, the properties of the Movima article also lack some other features typically associated with tense marking. Tense is generally defined as an inflectional category that is grammatically obligatory under certain circumstances (see Dahl/Velupillai 2005: 266). In Movima this is not the case; while the article is an obligatory part of an NP, its form is in the first place determined by whether the speaker believes an absent referent still to be in existence or not and by the relevance s/he attaches to this fact, in comparison to the relevance s/he attaches to temporal reference in discourse. At the present stage of the possible grammaticalization process from independent to propositional tense, the context does not demand a particular form of the article, as is the case for canonical verbal tense marking. Another typical feature of tense is that it is an anaphoric category (see Tonhauser 2006: 28). As was shown, the Movima article only displays anaphoricity to a limited degree, namely when its form is chosen according to the contextual time (see section 4.2.). In many other cases, however, it is chosen according to properties of the referent.

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[13] This is particularly relevant for the choice of the absential article in nonpast contexts, cf, 0 and 0 above. More research is needed here.

Thus, if interpreted in the narrow, theoretical sense, according to which tense does not apply semantically to nominals at all, the Movima system would have to be seen as something completely different from tense-marking systems. However, if the notion of tense is taken as a functional notion, i.e. as a deictic category of temporality, the Movima article system is a tense-marking system that marks the relation between two times. This perspective makes it possible to see one of the many different strategies that languages use to encode temporal relations, and thereby provides more insight into the human cognitive capacities.

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Judith Tonhauser

The Paraguayan Guaraní Future Marker *–ta*: Formal Semantics and Cross Linguistic Comparison

1. Introduction

Since the future, in contrast to the present and the past, is unknown, reference to future states of affairs is inherently non-factual.[1] For natural language semanticists, this raises the question of whether linguistic expressions used to refer to future states of affairs differ from those used to refer to past or present ones, for example in conveying both temporal and modal meanings. An empirical domain that holds answers to this question is the cross-linguistic set of future markers, i.e. expressions that can realize future time reference. Most, if not all, future markers that have been explored from a formal semantic perspective have been analyzed as conveying not just future temporal reference but also modal meaning(s): the English auxiliary *will*, for example, expresses future time reference with circumstantial or deontic modality (e.g. Sarkar 1998; Copley 2002; Kissine 2008), the Turkish suffix –*(y)Ecek* realizes future time reference with the modal attitude of prediction (Yavaş 1982), and Kalaallisut future markers evoke attitude states to *de se* prospects, starts of expected processes, or mark the speech act as a request or wish (Bittner 2005; see also Bittner, this volume). This small collection of future markers already indicates what has also been pointed out in the typological literature (e.g. Bybee/Pagliuca 1987; Bybee/Perkins/Pagliuca 1994), namely that future markers have a wide variety of modal meanings. Another point of cross-linguistic variation regarding future markers is that some entail future time reference, such as St'át'imcets (Salish) *kelh* (Matthewson 2006), while future time reference arises only with particular modal meanings with others: English *will*, for example, can realize present time reference with epistemic modality. This relates to the question of whether a particular future marker entails the modal meaning it conveys or is merely compatible with it. The semantic literature on English *will* shows how difficult it is to answer this question: English *will* has been analyzed as a future marker that also encodes modality (e.g. Enç 1996), as a future tense that does not encode modality (e.g. Kissine 2008) and as a modal marker that does not entail future time reference (e.g. Kaufmann 2005; Werner 2006).

Answers to the question of whether reference to future states of affairs in natural language is inherently modal presuppose detailed formal semantic explorations of future markers across a typologically diverse set of languages and the cross-linguistic comparison of the temporal and modal meanings of the cross-linguistic set of future markers. This paper contributes to the cross-linguistic study of future markers by exploring the truth conditional semantics of the Paraguayan Guaraní future marker *–ta*. This suffix is the marker most commonly used by consultants asked to translate Spanish sentences with future time reference. (1), for example, is the Paraguayan Guaraní (henceforth Guaraní) translation provided for the Spanish sentence *Cantaré* (sing.FUT.1sg) 'I will sing':[2]

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(1) Context: What will you do at the party tomorrow?
A-purahéi-**ta**.
A1sg-sing-FUT
'I will sing.' [E]

The next section provides background on temporal and modal reference in Guaraní before the meaning of *–ta* is explored in section 3. I argue that *–ta* is a future marker that entails future time reference in present and past contexts and is compatible with the modal meanings of intention and prediction (which are formally analyzed in Kratzer's (1981, 1991) framework). The formal semantic analysis is shown in section 4 to account for a counterfactual interpretation that arises when *–ta* co-occurs with certain past time adverbs. Section 5 concludes the paper by comparing *–ta* to other future markers that convey intentions and predictions, in particular English *will/would* and St'át'imcets *kelh.*

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[2] Guaraní is a Tupí-Guaraní language spoken by about four million people in Paraguay and surrounding countries. The data presented here were collected by the author with speakers in the departments of Guairá and Asunción from 2004 to 2008. Examples are marked to identify their origin; elicited examples are marked with [E], examples from a corpus of naturally occurring texts with [C]. The Guaraní examples are given in the standardized orthography used in Paraguay (Ministerio de Educación y Cultura 2004, cf. also Velázquez-Castillo 2004:1421f.), except that all postpositions are attached to their host. Accents are not written for normally accented words (stress on the final syllable); stressed nasal syllables are marked with a tilde. The language has two sets of cross-reference markers: the set A prefixes (which mark subjects of transitive and one set of intransitive verbs) are *a(i)–* 'A1sg', *ja(i)–* 'A1pl.incl', *ro(i)–* 'A1pl.excl', *re(i)–* 'A2sg', *pe(i)–* 'A2pl', and *o(i)–* 'A3'; the set B prefixes (which mark possessors and subjects of the other set of intransitive verbs) are *che(r)–* 'B1sg', *ñane(r)–* 'B1pl.incl', *ore(r)–* 'B1pl.excl', *nde(r)–* 'B2sg', *pende(r)–* 'B2pl', and *i(ñ)–/h–* 'B3'. The two portmanteaux prefixes *ro(i)–* '12sg' and *po(i)–*'12pl' refer to a first person subject and a second person (singular/plural) object. The glosses used are: 3.pronS/O = 3rd person subject/object pronoun, ABL = ablative, AT = cotemporaneity, CAUS = causative, COMPLETE = completive aspect, DEM = demonstrative, DES = desiderative, DIM = diminuitive, EMPH = emphatic, excl = exclusive, FUT = future marker, incl = inclusive, IMM.FUT = immediate future, IMP = imperative, JE = reflexive/passive, MIGHT = possibility modal, MUST = necessity modal, NEG = negation, NEG.IMP = negative imperative, NOM = nominalizer, NOM.FUT/PAST = future/past-oriented nominal marker (cf. Tonhauser 2007), PL = plural, PROG = progressive, PURP = purpose, QU = question, RC = relative clause, SAY = reportative evidential.

2. Background on Temporal and Modal Reference in Guaraní

Guaraní is a tenseless language (Tonhauser 2006, 2009c). Verbal stems are obligatorily inflected for person/number and need not co-occur with a temporal, aspectual or modal marker. In matrix clauses, these (temporally, aspectually and modally) *unmarked* verbs are compatible with present and past temporal reference, as illustrated in the examples in (2) and (3). The unmarked verb *a-purahei* (A1sg-sing) occurs with the present-time denoting adverb *ko'áĝa* 'now' in (2a) and with the past-time denoting adverb *kuehe* 'yesterday' in (2b). The examples in (3a) and (3b) illustrate unmarked verbs in discourse contexts with present and past temporal reference, respectively.

(2) a. Context: What are you doing?
Ko'áĝa **a-purahei**.
now A1sg-sing
'I am singing now. ' [E]
b. Kuehe **a-purahei**.
yesterday A1sg-sing
'Yesterday I sang/was singing.' [E]

(3) a. Context: Maria returns from checking on her daughter, who is in her room.
Rossáni **o-ke**.
Rossani A3-sleep
'Rossani is sleeping.' [overheard]
b. Context: A woman had a child out of wedlock.
I-memby **o-heja** ha **o-ho** mombyry.
B3-child A3-leave and A3-go far
'She left her child and went far away.' [C]

Unmarked verbs in matrix clauses are infelicitous in (most) future time contexts,[3] cf. (4a), or with future-time denoting adverbs, such as *ko'ẽro* 'tomorrow', as in (4b). Both utterances in (4) would be felicitous if the verb was marked with the future marker *–ta*.

(4) a. Context: What will you do tomorrow?
#**A-purahei**.
A1sg-sing
(Intended: I will sing.) [E]
b. #Ko'ẽro **a-purahei**.
tomorrow A1sg-sing
(Intended: Tomorrow I will sing.) [E]

In subordinate clauses, unmarked verbs are compatible with future time reference. This includes unmarked verbs in temporal adjunct clauses, as in (5a), in the antecedents of conditionals, as in (5b), and relative clauses of sentences whose main clause has future time reference, as in (5c), cf. Abusch (1998).

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[3] Recent fieldwork has revealed contexts where unmarked verbs are compatible with future temporal reference in matrix clauses (cf. Tonhauser 2009b). The question of how unmarked verbs are temporally and modally interpreted is left to future research.

(5) a. Re-karú-ta **re-jú**-rire.
A2sg-eat-FUT A2sg-return-after
‘You will eat after you return.’ [overheard]
b. **O-ký**-rõ ko’ẽro ja-pytá-ta óga-pe.
A3-rain-if tomorrow A1pl.incl-stay-FUT house-at
‘If it rains tomorrow we’ll stay home.’ [E]
c. Context: A child that just had an operation to restore its eye sight says:
Ko pyharé-pe a-mombe’ú-ta che-sý-pe o-pa mba’e
this night-at A1sg-tell-FUT B1sg-mother-to A3-complete thing
a-hechá-va ko ára-pe.
A1sg-see-RC this day-at
‘Tonight I’ll tell my mother about all the things I see today.’ [E]

Guaraní has several modal verbal markers, some of which can convey future time reference. This includes the possibility modal suffix *–ne* ‘-MIGHT’, the necessity modal –*va’erã* ‘-MUST’, the desiderative suffix *–se* ‘-DES’ and the counterfactual suffix *–mo’ã* (the semantics of the latter is discussed in detail in Tonhauser (2009a)). The examples in (6) show that *–ne* can express present time reference with epistemic modality, as in (6a), and future time reference with circumstantial modality, as in (6b). The necessity modal *–va’erã* realizes present time reference with epistemic modality in (7a) and future time reference (relative to a past time) with deontic modality in (7b). See Tonhauser (2006: ch.7) for more details on these modals.

(6) a. Context: A family is discussing who might disrespect them. The father says to the daughter:
Nde rei-kuáa**-ne**, che-memby!
B2sg A2sg-know-MIGHT B1sg-child
‘YOU might know, my child!’ [C]
b. Context: A farmer is looking at the clouds.
Ko’ẽro o-ký**-ne**.
tomorrow A3-rain-MIGHT
‘It might rain tomorrow.’ [E]

(7) a. Context: The speaker has just heard that a man’s daughter has gotten married.
O-vy’á-iterei**-va’erã**.
A3-happy-very-MUST
‘He must be very happy.’ [C]
b. Context: My grandmother milked the cows every morning.
O-vende-pá-rire o-japo**-va’erã** rambosa
A3-sell-COMPLETE-after A3-make-MUST breakfast
i-personal-kuéra-pe-ĝua-rã.
B3-personnel-PL-at-PURP-NOM.FUT
‘After she had sold all (the milk), she had to make breakfast for her personnel.’ [C]

The desiderative suffix *–se* ‘-DES’ realizes wishes and desires, and is often translated with the English verb *want*:

(8) a. Context: Somebody complains that Rita hasn’t come by for a long time. Rita says:
A-ju**-se** reí-ko po-hecha-mí.
A1sg-come-DES for.nothing-EMPH 12pl-see-DIM
‘I had wanted to come and see you.’ [C]

b. Context: Aniceto came here and...
He'i chḗ-ve aipo re-ju-**se**-ha re-ñe'ẽ.
A3.say B1sg-to DEM A2sg-come-DES-NOM A2sg-talk
'He told me that you wanted to come talk (to us).' [C]

Guaraní also has several aspectual morphemes, including the perfect aspect *–ma*, the completive aspect *–pa,* and the progressive aspect *hîna*. None of these convey future time reference; see Tonhauser (2006: ch.7) for details.

3. The Temporal and Modal Meaning of the Future Marker *–ta*

Previous literature on the future marker *–ta* holds that it marks future time reference (e.g. Gregores/Suárez 1967; Liuzzi/Kirtchuk 1989; Dessaint 1996; Guasch 1996; Meliá et al. 1997; Zarratea 2002; Nordhoff 2004; Velázquez-Castillo 2004). This section explores the temporal and modal semantics of this suffix from a truth-conditional semantic perspective. The discussion of the temporal meaning is couched in a Reichenbachian framework (Reichenbach 1947) where the reference time, the time a particular stretch of discourse is about (Klein 1994), mediates between the eventuality time (the time at which an eventuality is temporally located) and the utterance time.

3.1. Future time reference in present time contexts

In contexts with a present reference time, i.e. where the reference time is the utterance time, the eventuality denoted by a matrix clause verb marked with *–ta* is true at a time in the future of the utterance time. The suffix *–ta* is compatible with future time reference of varying distance, as illustrated by the examples in (9), which contain future-time denoting temporal adverbs of increasing temporal remoteness.[4,5]

(9) a. A-haí**-ta** peteĩ kuatiañe'ẽ ág̃a-ite.
A1sg-write-FUT one card now-very
'I will write a card right now.' [E]
b. Ko ára-pe a-jahú**-ta**.
this day-at A1sg-bathe-FUT
'I will bathe today.' [E]

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[4] These data show that *–ta* cannot be analyzed as a marker of near future or imminence, as has been proposed in Liuzzi/Kirtchuk (1989), Dessaint (1996), Guasch (1996) and Meliá et al. (1997).

[5] Immediate future is also expressed with the suffix *–pota*, cf. (i). Whether this suffix could be analyzed as consisting of a suffix *–po* and the future suffix *–ta* is an open question.
(i) Che-rendy-**pota**-ité-ko ai-kó-vo.
B1sg-burn-IMM.FUT-very-EMPH A1sg-be-AT
'I am about to explode (lit.: burn).' (adapted from Liuzzi/Kirtchuk 1989:34)

c. Ko'ẽro a-purahéi**-ta**.
tomorrow A1sg-sing-FUT
'I will sing tomorrow.' [E]

d. A-japo-pá**-ta** la eskuéla ótro ányo-pe.
A1sg-do-COMPLETE-FUT the school other year-at
'I will finish school next year.' [E]

e. Ko múndo o-pá**-ta** un mijon anyo-há-pe.
this world A3-finish-FUT one million year-NOM-at
'The world will end in a million years.' [E]

Both unmarked verbs and verbs marked with *–ta* are compatible with the temporal adverbs *ko'âĝa* 'now' and *ko éste día* 'today', whose denotation includes the utterance time. With such adverbs, unmarked verbs have past or present temporal reference (depending in part on the Aktionsart of the proposition, cf. Tonhauser (2006: ch.7)), as in the naturally occurring example in (10a), while verbs marked with *–ta* have future time reference, as in (10b):

(10) a. Libória ko éste día **o-menda**.
Liboria this this day A3-marry
'Liboria married today.' [C]

b. Libória ko éste día o-menda**-ta**.
Liboria this this day A3-marry-FUT
'Liboria will marry today.' [E]

In out-of-the-blue contexts, where the reference time is the utterance time, the suffix *–ta* is incompatible with past-time denoting adverbs:

(11) #Kuehe a-purahéi**-ta.**
yesterday A1-sing-FUT [E]

The infelicity of (11) is a first piece of evidence that *–ta* entails future time reference. Further evidence is that all of the 77 naturally occurring instances of *–ta* in my corpus[6] realize future time reference, and my reading of additional Guaraní texts has not revealed examples where *–ta* does not express future time reference. Furthermore, attempts to elicit examples with *–ta* that do not have future time reference failed (cf. section 5).

To formally account for the future time reference entailed by *–ta* in the Reichenbachian framework assumed in this paper means to identify whether *–ta* locates the eventuality time in the future of the reference time (prospective aspect, cf. Bohnemeyer 2002) or whether it locates the reference time in the future of the utterance time (future tense). Under the former analysis, the infelicity of (11) can be accounted for by assuming that the reference time is the utterance time in this out-of-the-blue context and that the temporal adverb *kuehe* 'yesterday' locates the eventuality time in the past of the reference time, thereby contradicting the requirement introduced by *–ta* that the eventuality time is in the future of the reference time. On the latter analysis, according to which *–ta* is a future tense, (11) could be accounted for by assuming that *kuehe* 'yesterday' locates the reference time in the past of the utterance time, thereby conflicting with the requirement introduced by *–ta* that the reference time be in the future of the utterance time. The data presented in sections 3.3. and 4. provide evidence for the former analysis.

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[6] The corpus is a collection of nine texts from different genres (fables, personal narratives, conversation). It consists of about 7,300 Guaraní words, which correspond to about 20,000 English words since Guaraní is mildly polysynthetic.

3.2 Modal meanings: Intention and prediction

Future time reference with *–ta* is compatible with a limited set of modal meanings, namely intention and prediction. Utterances with the modal meaning of intention convey an agent's mental state of intending to make a proposition be true at a time in the future; the intender is committed to do what she can to make the proposition true. No such commitment or implication of agency is necessarily associated with predictions. Rather, with predictions the speaker asserts that the proposition will be true at a time in the future: the speaker expresses that, given her epistemic state, she is committed to the truth of the proposition at a future time. Utterances with *–ta* are also compatible with the modal meaning of expectation, a weaker type of prediction in the sense that the speaker does not assert that the proposition will be true in the future but states a strong conviction that, given her epistemic state, the proposition is true at a future time. What the two modal meanings – intention and prediction/expectation – have in common is that they are intrinsically future-oriented: if something is already so, we cannot *intend* to make it so; and if something is true and we know it, we cannot *predict* its truth or *expect* it, but can only assert or believe it.

Of the 77 examples with *–ta* in the corpus, 39 convey intentions and 38 predictions or expectations. Representative examples of each are given in (12) and (13), respectively.

(12) a. Context: A woman is scheming on how to catch the monkey that is playing tricks on her.
A-japó**-ta** ta'anga araity kakuaa porã-va.
A1sg-make-FUT figure wax big pretty-RC
'I will make a pretty big wax figure.' [C]

b. Context: A monkey is stuck with hands and legs, and threatens to use its teeth to defend itself.
Roi-su'ú**-ta**, roi-su'ú**-ta**.
12sg-bite- FUT 12sg-bite- FUT
'I will bite you, I will bite you.' [C]

c. Context: A woman has just arrived at the house of a friend.
Che-are-mí**-ta** gueteri!
B1sg-stay-DIM-FUT still
'I'm still going to stay.' [C]

(13) a. Context: A father is happy that his daughter will come back home.
Hasypevé-ko péina o-je-arreglá**-ta** ko asúnto hetá-ite
finally-EMPH DEM A3-JE-resolve- FUT this matter much-very
ñane-mo-'akã-rasý-va'e-kue.
B1pl.incl-CAUS-head-hurt-RC-NOM.PAST
'Finally this matter will get resolved that has been giving us much headache.' [C]

b. Context: The boy and his dog have left the frog. The frog says: "I will follow them and then...
...ai-kuáa**-ta** moõ-pa oi-ko."
...A1sg-know- FUT where-QU A3-live
'...I will know where they live.'" [C]

c. Context: A girl is told by her mother that the neighbors talk badly about her because of some past incident.
Ha nde-ru i-tarová**-ta** voi i-mandu'á-ramo upéva-rehe.
and B2sg-father B3-crazy-FUT surely B3-remember-if this-about
'And your father will go crazy if he remembers it.' [C]

Utterances with *–ta* do not entail that the eventualities will be realized. For example, the story in which (12b) appears makes clear that the speaker of (12b) did not end up biting the addressee, and the father does not end up going crazy in the story of (13c).

I formally analyze the modal meanings of intention and prediction/expectation in Kratzer's (1981, 1991) framework, where modals are quantifiers over a contextually restricted set of possible worlds. I assume that worlds are world histories, i.e. a world is not a static entity where things are fixed once and for all, but rather one way in which things develop over time. The set of accessible worlds over which a particular modal expression quantifies is determined by two contextually given functions from world-time pairs to conversational backgrounds (sets of propositions) referred to as the modal base and the ordering source. The modal base of utterances with *–ta* that convey intention is circumstantial: applied to an index (a world-time pair), it returns the set of propositions denoting the circumstances that are relevant at the index. In (12a), for example, propositions denoting currently relevant circumstances include 'There is a monkey', 'There is a woman' and 'The monkey is annoying the woman'; *–ta* quantifies over those worlds in which all of these propositions are true. The fact that (12a) is not entailed to be true at a future time is formally accounted for by requiring that the conversational background returned by the ordering source is not empty. If it was empty, (12a) would specify that the woman makes a wax figure at a time in the future of the evaluation time in all worlds in which the currently relevant circumstances are true, which is not necessarily the case. Rather, the conversational background returned by the ordering source for *–ta* with a circumstantial modal base is the set of propositions denoting the agent's intentions; for (12a), this includes the woman's intention to catch the monkey. Hence, (12a) is true at the time and world of evaluation if and only if, in all worlds where the circumstances relevant at the time and world of evaluation are true and that are best with respect to the woman's intentions, i.e. where these intentions are realized, there is a time in the future of the time of evaluation at which the woman makes a wax figure.

The modal meaning of prediction involves an epistemic modal base, which when applied to an index returns the set of propositions denoting what the speaker knows at that index. In (13c), for example, the speaker's epistemic state includes the propositions 'My daughter did something bad in the past' and 'Her father is still mad about what his daughter did'. The ordering source in utterances where *–ta* conveys a prediction is a stereotypical one: it consists of propositions that characterize the normal course of events. The modal meaning of *–ta* in these examples is to quantify over those worlds that are best with respect to the epistemic modal base and the stereotypical ordering source, i.e. worlds in which what the speaker knows is true and that develop as expected. According to this analysis, (13c) is true at the time and world of evaluation if and only if, in all worlds where what the mother knows about the past incident and how people currently feel about it is true and that develop as expected, there is a time in the future of the time of evaluation at which the father goes crazy.

When we consider how the world stereotypically develops, not everything is fixed up to the last detail; a development might be stereotypical regardless of whether some proposition is true or not. Intuitively, whether the speaker predicts or merely expects a state of affairs to occur depends on how sure the speaker is, given how the world stereotypically develops, that the state of affairs will occur. If the speaker asserts that the state of affairs will occur if the world develops one way or another, the speaker is surer of it than if she asserts that the state of affairs will occur if the world develops in one particular way. The (gradual) difference between prediction and expectation is therefore formally analyzed here as a difference in the size and nature of the set of propositions returned by the stereotypical ordering source. With expectations, the ordering source consists of a consistent set of propositions that characterize one way in which the world normally develops. (13c), for example, could be interpreted as an expectation if the stereotypical conversational background includes the propositions ‘The world does not suddenly end’, ‘The father does not stop caring about what people think about the family’, ‘The father chats with the neighbors in the evening’ and ‘The neighbors tell the father what they think about his daughter’s behavior’. If this is how the world develops, the speaker expects the father to go crazy, if he remembers the daughter’s behavior. In order for (13c) to be interpreted as a prediction, on the other hand, the speaker asserts that the state of affairs will come about regardless of whether some proposition is true or not, e.g. if the stereotypical conversational background consists of the additional proposition ‘The neighbors do not tell the father what they think about his daughter’s behavior’. Thus, (13c) is a prediction if, regardless of whether the neighbors talk to the father or not, the father goes crazy, if he remembers the daughter’s behavior. Since the former ordering source requires the highest-ranked worlds to be worlds in which the neighbors tell the father what they think, while the latter ordering source ranks highest both worlds in which they tell the father what they think and worlds in which they don’t, the set of worlds quantified over with the latter ordering source is larger, thus leading to a stronger necessity claim. Since prediction and expectation involve the same modal base and stereotypical ordering sources, it is correctly predicted that the two are hard to distinguish for examples with little or no discourse context or information about the speaker.

The two types of modal meaning conveyed by *–ta* cannot be analyzed with the same modal base and ordering source. In (13c), for example, the speaker’s, the father’s, and the daughter’s intentions are not relevant. Likewise, the examples in (12) cannot be analyzed as involving an epistemic modal base and a stereotypical ordering source: in (12b), the monkey’s epistemic state is not relevant and worlds that develop stereotypically might be ones where he stays tied up. What is relevant, rather, are the current circumstances and his intentions.

The use of *–ta* is not limited to assertions and it conveys the same modal meanings when it realizes future time reference in questions, as illustrated in the examples in (14): for example, (14a) inquires about the addressee’s intentions, and the question in (14b) (rhetorically) inquires about the addressee’s expectations about people’s reactions.

(14) a. Context: A visitor is asked by his host:
Nde-aré**-ta** gueteri-pa árupi?
B2sg-stay-FUT still-QU here
'Will you stay here a bit longer?' [C]
b. Context: A daughter is indignant about what people will say about her behavior. She asks:
Mba'é-piko he'í**-ta**?!
what-EMPH A3.say-FUT
'What will they say?!' [C]

The suffix *–ta* is not used in imperatives[7] but it can be used with imperative illocutionary force in situations where a person in authority has expectations about another person's behavior; this is illustrated by the examples in (15).

(15) a. Context: A teacher advises a student who has just hurt her hand very badly.
Re-pytá-**ta**-nte ko do tre semána.
A2sg-stay-FUT-just this two three week
'You will stay (home) for two or three weeks.' [C]
b. Context: A doctor instructs a mother on how to make a therapeutic device out of a glove:
Kóva-pe re-hó**-ta** re-moĩ arína.
this-in A2sg-go-FUT A2-put flour
'You will go and put flour into this.' [C]

These examples convey a strong expectation on part of the speaker for a particular future action of the addressee. Formally, the interpretation of such examples involves an epistemic modal base: in (15a), what the teacher knows includes the propositions that the student won't be able to write for a while, that it takes the student 40 minutes to walk to school, that the student needs to make sure her hand heals and that she considers the teacher a person of authority. The ordering source is stereotypical. Thus, by using (15a), the teacher conveys that, in all worlds in which what the teacher knows is true and that develop stereotypically, the student stays home. Likewise, in (15b), the doctor knows that the mother trusts the doctor, considers him a person of authority (as evidenced by their previous interaction), wants her daughter's hand to heal and knows that the device is an accepted means for healing the hand. In all worlds in which all the propositions in the modal base are true and that develop stereotypically, the mother prepares the device as instructed.

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[7] Positive imperatives are expressed with a special second person cross-reference marker, negative ones with the marker *ani*:
(i) a. **E-**ju ápe, **e-**guapy che-yké-rehe, che-memby!.
A2sg.IMP-come here A2sg.IMP-sit B1sg-side-at B1sg-child
'Come here and sit next to me, my child!' [C]
b. **Ani** e-mombo yty tapé-pe.
NEG.IMP A2sg.IMP-throw garbage path-in
'Do not litter.' [sign in bus]

3.3. Future time reference in past time contexts

The examples so far have been limited to ones uttered in contexts with a present reference time. In these contexts, the situation time of the eventuality is located in the future of the utterance/reference time. The examples in this section show that *–ta* can also express future time reference in contexts with a past reference time, i.e. that *–ta* is not limited to deictic future time reference.

The examples in (16) are both taken from a story in which a mother recounts how her daughter severely injured her hand and had to be treated for a long time afterwards. In both examples, the reference time is a contextually given past time and *–ta* conveys that the eventuality time is temporally located in the (relative) future of the contextually given past time. Such examples are therefore translated into English with *would*, not *will*.

(16) a. Context: The mother tells how she started taking care of her daughter's wound, which she has not yet seen at the past time of the story (but she has at the utterance time).
Che la a-japo-há-pe chupe la kurasion priméra ves
B1sg the A1sg-do-NOM-at pron.3O the cure first time
a-hechá**-ta** hĩna.
A1sg-see-FUT PROG
'And I, when I was cleaning her wound, I would see it for the first time.' [C]

b. Context: The mother received a call from the school that her daughter had had an accident at school and was now at the hospital. The teacher told her to come to a particular road crossing.
Upépeve o-guerú**-ta** chupe la i-profesor.
there A3-bring-FUT pron.3O the B3-teacher
'Her teacher would/was going to bring her there.' [C]

At the past reference time of (16a), the mother has never seen the wound (the daughter was treated in a hospital) and (16a) expresses that at that past time she had the expectation that she would, at a time in the future of the past time, see the wound. (16b) reports that, at the contextually given past time, the teacher had the intention of bringing the daughter to the road crossing.

The suffix *–ta* can also occur in embedded clauses that are interpreted with respect to a past time, as in (17), which expresses the teachers' expectation that the speaker's daughter would arrive later than the other school children due to her injury:

(17) Context: "They called me to tell me not to worry about my daughter..."
...porque o-ĝuahé**-ta** tarde-ve i-compañéra-kuéra-gui.
...because A3-arrive- FUT late-more B3-school.friend-PL-ABL
'...because she would arrive later than her school friends.' [C]

This example also shows that utterances with *–ta* do not entail the realization of the eventuality even when the eventuality is temporally located in the future of a (past) reference time: the context of the story in which (17) occurs makes clear that the daughter never arrived at home but instead had to be picked up by the mother at a road crossing.

In the examples in (18) and (19), *–ta* is realized on verbs in relative clauses (marked with *–va* '-RC') and complement clauses (marked with *–ha* '-NOM'), respectively. In (18a), the situation time of the eventuality denoted by the relative clause is in the future of a contextually given past time; in (18b), it is in the future of the utterance time.

(18) a. Context: “And he hissed and sputtered at me.”
Pytã-mba ko gríngo, ñemo’a ku o-soró-**ta**-va
red-COMPLETE this gringo like DEM A3-explode-FUT-RC
‘He was completely red, this gringo who looked like he would explode.’ [C]
b. E-kiriri ha e-hendu ko ha’é-**ta**-va ndé-ve!
A2sg.IMP-quiet and A2sg.IMP-listen this A1sg.say-FUT-RC B2sg-to
‘Shut up and listen to what I will tell you.’ [C]
c. O-nasẽ kuri peteĩ mitã réy-**ta**-va.
A3-born back. then one child king-FUT-RC
‘A child was born who will/would be king.’ [E]

(18c) is felicitous in two kinds of discourse contexts, which result in interpretations of (18c) that correspond to the interpretations of the English translations with *will* and *would*, respectively. The first discourse context is one in which the child was born in the past of the utterance time and has not yet become king at the utterance time but is expected to (i.e. the relative clause is interpreted with respect to the utterance time); the second context is one in which the child was born in the past of the utterance time and already became king (i.e. the relative clause is interpreted with respect to the past reference time). These two interpretations are expected, given that verbs marked with *–ta* can be interpreted relative to both a present and a past reference time.

When *–ta* occurs on a verb in a complement clause marked with *–ha* ‘-NOM’,[8] the situation time of the eventuality is (typically) located in the future of the situation time of the matrix eventuality, which is at the utterance time in (19a) and at a past time in (19b,c).

(19) a. Context: A monkey advises a fox on how to win a woman’s hand.
Áĝa o-já-vo nde-yké-pe ere chupe re-mendá-**ta**-ha.
now A3-join-AT B2sg-side-at A2.say pron.3O A2sg-marry-FUT-NOM
‘Now, when she comes to your side, tell her that you will marry.’ [C]
b. Context: A girl has badly injured her hand.
Nd-o-krée-i la i-kuã ha’e o-rekuperá-jeý-**ta**-ha
NEG-A3-believe-NEG the B3-finger pron.3S A3-recuperate-again-FUT-NOM
‘She didn’t believe that her fingers would recuperate.’ [C]
c. Context: A man calls over his dog to inspect something*s*.
Pe jagua o-ñepyrũ tuicha o-ñarõ, oi-mo’ã-re o-ñe-me’ẽ-**ta**-ha
that dog A3-start big A3-bark A3-think-about A3-JE-give- FUT-NOM
ichupe tembi’u.
pron.3O food
‘That dog started to bark loudly thinking that it would be given food.’ [C]

In these examples, too, the future time reference conveyed by *–ta* comes with either of the modal meanings of intention or prediction/expectation. (19a), for instance, expresses that the fox should voice his intention of marrying the woman; (19b) conveys the girl’s beliefs at the contextually given past time about her expectations for the recovery of her fingers; these expectations are based on what she knows about her situation (her fingers are badly hurt, the doctor gave her a bad diagnosis) and how the world stereotypically develops.

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[8] Complement clauses can additionally be marked with the nominal temporal marker *–kue*, analyzed as a terminative aspect in Tonhauser (2006, 2007), which affects the temporal interpretation of the complement clause (cf. Tonhauser 2006).

3.4. Formal semantic analysis

The previous sections illustrated that Guaraní utterances with the future marker *–ta* are felicitous in contexts where the reference time is the utterance time but also in contexts where the reference time is a past time. Under the assumption that tenses impose a constraint on the relation between the reference time and the utterance time (e.g. Klein 1994; Bittner 2005), this conclusively shows that *–ta* is not a future tense but rather a prospective aspect, which locates the eventuality time in the future of the reference time. This section develops a formal semantic analysis according to which *–ta* entails such a future temporal meaning; this is motivated by the finding that all naturally occurring examples of *–ta* convey future time reference and that it was not possible to elicit examples to the contrary (cf. section 5).

The syntax and semantics of the fragment is expressed in a Combinatoric Categorial Grammar framework (cf. Steedman 1996). The lexicon consists of triples of the form

(20) $phon : \mathrm{CAT} : [[sem]]^{M,g,i,j,w}$

where *phon* is a phonological string, CAT the syntactic category of the lexical item and $[[sem]]^{M,g,i,j,w}$ the denotation of the (logical translation of the) expression in a model M, under an assignment function g, at times i and j, and a world w. (The nature of the times i and j is clarified below.) The rules in (21) compositionally determine the syntactic category and meaning of a complex expression *ab* from the syntactic categories and meanings of the expressions *a* and *b* that make up the complex expression: the string *ab* is derived by concatenating the string *a* and the string *b*, the syntactic category of *ab* is A (since, e.g. in Forward Function Application, the syntactic category of *a* is A/B (“A looking for B to its right”) and *b* is an expression of syntactic category B to its right), and the denotation of *ab* is derived by applying the denotation of (the translation of) *a* to that of *b*.

(21) a. Forward Function Application (FA)

$$\frac{a : \mathrm{A/B} : [[a']]^{M,g,i,j,w} \qquad b : \mathrm{B} : [[b']]^{M,g,i,j,w}}{ab : \mathrm{A} : [[a'(b')]]^{M,g,i,j,w}}$$

b. Backward Function Application (BA)

$$\frac{b : \mathrm{B} : [[b']]^{M,g,i,j,w} \qquad a : \mathrm{A}\backslash\mathrm{B} : [[a']]^{M,g,i,j,w}}{ba : \mathrm{A} : [[a'(b')]]^{M,g,i,j,w}}$$

The denotations of Guaraní expressions are given as the denotations of expressions in a typed lambda calculus with basic types ε (for individuals), ι (for intervals, also referred to as times below), ω (for worlds), and τ (for truth values). The denotations are specified in an intensional model $M = \langle U,F,T,W \rangle$,where U is the universe of entities, F an interpretation function, T a (non-empty) set of times and W a (non-empty) set of worlds. The denotations of constants are given by F and depend on the world w and the time i, those of variables are given by the variable assignment function g as follows:

(22) a. If α is a constant, $[[\alpha]]^{M,g,i,j,w} = F(\alpha, w, i)$.
b. If α is a variable, $[[\alpha]]^{M,g,i,j,w} = g(\alpha)$.

Following Dowty (1982), I assume that the time i that the interpretation function [[.]] makes reference to corresponds to Reichenbach's (1947) reference time, and that this time is contextually given in narrative discourse but can also be constrained by temporal adverbs (cf. Partee 1984; Dowty 1986; Hinrichs 1986; Kamp/Reyle 1993; Klein 1994). The time j is the utterance time; this time is used to specify the meanings of temporal expressions (see below). I assume three designated variables, rt and now of type ι and w^* of type ω, which denote the reference time i, the utterance time j and the world of evaluation w, respectively:

(23) a. $[[rt]]^{M,g,i,j,w} = i$
b. $[[now]]^{M,g,i,j,w} = j$
c. $[[w^*]]^{M,g,i,j,w} = w$

Verbs denote functions from individuals to sets of world-time pairs. In (24), the intransitive verb *o-ke* 'A3-sleep' (type $\langle \varepsilon, \langle \omega, \langle \iota, \tau \rangle\rangle\rangle$) combines with its argument *Rossáni* (the constant r in (24) is of type ε).[9] The resulting expression of semantic type $\langle \omega, \langle \iota, \tau \rangle\rangle$ and syntactic category S_{rad} is referred to as a *sentence radical.*

(24) Derivation of the sentence radical *Rossáni o-ke* 'Rossani A3-sleep':

$$\dfrac{\textit{Rossáni} : \mathrm{NP} : [[r]]^{M,g,i,j,w} \qquad \textit{o-ke} : \mathrm{S}_{rad}\backslash\mathrm{NP} : [[\lambda x \lambda w' \lambda t\ [sleep'(x)(t, w')]\ ]]^{M,g,i,j,w}}{\textit{Rossáni o-ke} : \mathrm{S}_{\mathrm{rad}} : [[\lambda w' \lambda t\ [\mathrm{sleep}'(\mathrm{r})(\mathrm{t}, \mathrm{w}')]\ ]]^{M,g,i,j,w}}\ \mathrm{BA}$$

After beta-reduction, the denotation of the sentence radical denoted by *Rossáni o-ke* (Rossani A3-sleep) is $[[\lambda w' \lambda t[sleep'(r)(t,w')]]]^{M,g,i,j,w}$, the set of world-time pairs at which Rossani sleeps.

I use the NON-FUT operator defined in (25) to account for the non-future temporal interpretation of unmarked verbs and verbs marked with *–ta.*[10] This (phonologically zero) operator instantiates its argument at the world of evaluation w^* and the reference time rt, and requires the reference time to be a non-future time ($rt \leq now$), i.e. the reference time interval can strictly precede the utterance time interval or be identical to it.

(25) Lexical entry of the NON-FUT operator:
$\emptyset : \mathrm{S}/\mathrm{S}_{rad} : [[\ \lambda P_{\langle \omega, \langle \iota, \tau \rangle\rangle}\ [P(w^*)(rt)\ \&\ rt \leq now]\ ]]^{M,g,i,j,w}$

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[9] The arguments of a verb in Guaraní need not be realized by an independent pronoun or a full noun phrase; *o-ke* 'A3-sleep', for example is a well-formed sentence with the meaning 'S/he/it sleeps/slept'. Such examples are not treated here.

[10] As mentioned in footnote 3, there are discourse contexts in which unmarked verbs can receive a future time interpretation. I leave for future research the question of whether a NON-FUT operator is empirically motivated in the temporal analysis of Guaraní and, if yes, the identification of the conditions under which the operator is applied.

Applying the NON-FUT operator to the output of (24) yields the truth-conditions in (26b) for example (3a), repeated as (26a) below:

(26) a. Context: Maria returns from checking on her daughter, who is in her room.
Rossáni o-ke. (= (3a))
Rossani A3-sleep
'Rossani is sleeping.' [overheard]
b. $[[(26a)]]^{M,g,i,j,w} = [[\ \text{NON-FUT}\ (\textit{Rossáni o-ke})]]^{M,g,i,j,w}$
$= [[\ \text{NON-FUT}\ (\lambda w'\lambda t[sleep'(r)(t, w')])]]^{M,g,i,j,w}$
$= [[\lambda P_{\langle\omega,\langle\iota,\tau\rangle\rangle}[P(w^*)(rt)\ \&\ rt \leq now](\lambda w'\lambda t[sleep'(r)(t, w')])]]^{M,g,i,j,w}$
$= [[sleep'(r)(rt, w^*)\ \&\ rt \leq now]]^{M,g,i,j,w}$

In the context given for (26a), the reference time *i* is the utterance time *j*. Hence, according to (26b), (26a) is true if and only if Rossani sleeps at the utterance time. (The relation between the reference time and the time of the eventuality of Rossani sleeping is determined by Aktionsart, which is not considered here.)

Temporal adverbs such as *kuehe* 'yesterday' and *ko'ẽro* 'tomorrow' are modifiers of sentence radicals (type $\langle\langle\langle\omega,\langle\iota,\tau\rangle\rangle, \langle\omega,\langle\iota,\tau\rangle\rangle\rangle\rangle$); they restrict the time at which the sentence radical is located to the day before or after the one containing the utterance time *now*, respectively:

(27) a. *kuehe* 'yesterday' : $\mathrm{s}_{rad}/\mathrm{s}_{rad}$: $[[\ \lambda P\lambda w'\lambda t[P(w')(t)\ \&\ t \subseteq yesterday'_{now}]\ ]]^{M,g,i,j,w}$
b. *ko'ẽro* 'tomorrow' : $\mathrm{s}_{rad}/\mathrm{s}_{rad}$: $[[\ \lambda P\lambda w'\lambda t[P(w')(t)\ \&\ t \subseteq tomorrow'_{now}]\ ]]^{M,g,i,j,w}$

Since these temporal adverbs apply to sentence radicals, they are interpreted in the scope of the NON-FUT operator. In the semantic analysis of examples like (2b) and (4b), repeated in (28a) and (29a) below, the temporal adverbs therefore constrain the location of the reference time. The semantics correctly predicts the (un)acceptability of the two deictic temporal adverbs with unmarked verbs (the variable *sp* refers to the speaker):

(28) a. Kuehe a-purahei. (= (2b))
yesterday A1sg-sing
'Yesterday I sang/was singing.' [E]
b. $[[(28a)]]^{M,g,i,j,w} = [[\text{NON-FUT}\ (kuehe(a\text{-}purahei))]]^{M,g,i,j,w}$
$= [[\text{NON-FUT}\ (kuehe(\lambda w'\lambda t[sing'(sp)(t, w')]))]]^{M,g,i,j,w}$
$= [[\text{NON-FUT}\ (\lambda w'\lambda t[sing'(sp)(t, w')\ \&\ t \subseteq yesterday'_{now}])]]^{M,g,i,j,w}$
$= [[sing'(sp)(rt, w^*)\ \&\ rt \subseteq yesterday'_{now}\ \&\ rt \leq now]]^{M,g,i,j,w}$

(29) a. #Ko'ẽro a-purahei. (= (4b))
tomorrow A1sg-sing
(Intended: 'Tomorrow I will sing.') [E]
b. $[[(29a)]]^{M,g,i,j,w} = [[\text{NON-FUT}\ (ko\text{'}\tilde{e}ro(a\text{-}purahei))]]^{M,g,i,j,w}$
$= [[sing'(sp)(rt, w^*)\ \&\ \underline{rt \subseteq tomorrow'_{now}\ \&\ rt \leq now})]]^{M,g,i,j,w}$

(28a) is true if and only if the speaker sings at the contextually given reference time *rt*, which is constrained to lie before or at the utterance time and within the time denoted by *kuehe* 'yesterday'. By contrast, in (29a), the non-future reference time *rt* is required to be located within the time denoted by *ko'ẽro* 'tomorrow' (cf. the underlined parts of the formula in (29b)). This contradiction renders such utterances infelicitous.

The formal semantic analysis of *–ta* is given in (30). According to this lexical entry, *–ta* presupposes an epistemic modal base (and a stereotypical ordering source) or a circumstantial modal base (and an ordering source that specifies the agent's intentions). I borrow from Portner (1998) the three-place functor 'best' which, I assume, applies to the modal base MB, the ordering source OS and the pair $\langle w^*, rt\rangle$ consisting of the world of evaluation w^* and the reference time rt, and which returns the set of worlds w' in the modal base that are best with respect to the ordering source at $\langle w^*, rt\rangle$.[11] If the modal presupposition is fulfilled, *–ta* introduces a time t' in the future of the reference time rt (the temporal meaning of *–ta*) at which the eventuality is temporally located in all worlds w'.

(30) Lexical entry of the Guaraní future marker *–ta*:
–ta presupposes an epistemic modal base with stereotypical ordering source or a circumstantial modal base with an ordering source that specifies the agent's intentions. If defined:
–ta : $\text{S}\backslash\text{S}_{rad}$: $[[\lambda P_{\langle \omega, \langle \iota, \tau\rangle\rangle}\,[\forall w'(w' \in best(MB,OS, \langle w^*, rt\rangle\,) \rightarrow \exists t'(rt < t' \;\&\; P(w')(t')))]\;]]^{M,g,i,j,w}$

In utterances made out of the blue, such as (9c), repeated as (31a) below, the reference time is the utterance time. Here, *–ta* behaves like a deictic future marker. Since the temporal adverb *ko'ẽro* 'tomorrow' is a modifier of sentence radicals (S_{rad}), it is outscoped by *–ta* (which applies to sentence radicals to return a sentence S). As a consequence, the temporal adverb here constrain the location of the eventuality time, not the reference time.

(31) a. Ko'ẽro a-purahéi-**ta**. (= (9c))
tomorrow A1sg-sing-FUT
'I will sing tomorrow.' [E]

b. $[[(31a)]]^{M,g,i,j,w}$ is defined for an epistemic modal base with stereotypical ordering source or a circumstantial modal base with an ordering source that specifies the agent's intentions. If defined,
$[[(31a)]]^{M,g,i,j,w} = [[–ta(ko\text{'}\tilde{e}ro(a\text{-}purahei))]]^{M,g,i,j,w}$
$= [[–ta(\lambda w'\lambda t[sing'(sp)(t, w') \;\&\; t \subseteq tomorrow'_{now}]\;]]^{M,g,i,j,w}$
$= [[\forall w'\,(w' \in best(MB,OS, \langle w^*, rt\rangle)$
$\rightarrow \exists t'(rt < t' \;\&\; sing'(sp)(t', w') \;\&\; t' \subseteq tomorrow'_{now}))]]^{M,g,i,j,w}$

According to this semantics, (31a) is correctly predicted to be true if and only if, in all worlds w' that are best with respect to the modal base MB and the ordering source OS at the world of evaluation w^* and the reference/utterance time rt, there is a time t' that is in the future of the reference time and included in the denotation of *ko'ẽro* 'tomorrow' at which the speaker sings.

The analysis correctly predicts that examples like (32a) are infelicitous when uttered out of the blue, i.e. in a context where the reference is the utterance time: the eventuality time of the speaker's singing is located at a time t' in the future of the utterance/reference time by *–ta* and within the denotation of *kuehe* 'yesterday' (cf. the underlined material in (32b)).

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[11] Portner's (1998) 'best' comes with the Limit Assumption, the assumption that there always is a unique best set of worlds (p.771).

(32) a. #Kuehe a-purahéi**–ta**. (= (11))
yesterday A1sg-sing-FUT [E]
b. $[\![\forall w' \, (w' \in \mathit{best}(MB, OS, \langle w^*, rt\rangle)$
$\rightarrow \exists t'(\underline{rt < t'} \; \& \; \mathit{sing}'(sp)(t', w') \; \& \; \underline{t' \subseteq \mathit{yesterday}'_{now}}))]\!]^{M,g,i,j,w}$

The analysis of *–ta* also correctly predicts that examples like (32) where *–ta* co-occurs with a past-time denoting temporal adverb are not infelicitous in *all* contexts. Since the semantics given for *–ta* in (30) does not constrain the location of the reference time with respect to the utterance time, it correctly predicts that *–ta* can express future time reference with respect to contextually given past times. When it does, as in the examples given in the preceding section, the semantics of *–ta* can be reconciled with that of a past time adverb. (33) is an example with a (non-deictic) past time adverb:

(33) Context: A Paraguayan friend complains that I returned to Paraguay later than I said I would the last time we saw each other.
Ere ambue arý-pe ché-ve e-jú-**ta**-ha-gue octúbre
A2sg.say other year-at B1sg-to A2sg-return-FUT-NOM-NOM.PAST October
ñepyrû-há-pe.
beginning-NOM-at
'You told me last year that you would return (last) October.' [E]

In this example, the co-occurrence of *–ta* with a past time denoting adverb is felicitous since the eventuality denoted by the embedded clause can be temporally located in the future of the (past) reference time while simultaneously satisfying the requirement that it be located at the past time denoted by *octúbre ñepyrû-há-pe* 'beginning of (last) October'.

4. Implicated Counterfactuality

The analysis of *–ta* developed in the previous section correctly predicts a counterfactual interpretation that arises when *–ta* co-occurs with the past time adverbs *kuri* or *va'ekue.* While *–ta* is incompatible with past-time denoting adverbs such as *kuehe* 'yesterday' in contexts with a present reference time (cf. (11)), it may co-occur with the past-time adverbs *kuri* and *va'ekue*. The discussion here is limited to *kuri,* which is illustrated in (34).

(34) Context: José extended a picnic blanket over the cricket's cave.
Ha kirikiri ho'u **kuri** hĩna peteĩ togue kyrỹi, i-karú-pyhare.
and cricket A3.eat back.then PROG one leaf tender B3-food-night
'And the cricket was eating a tender leaf, its dinner.' [C]
Not: 'And the cricket is eating a tender leaf, its dinner.'

(34) occurs in a discourse context with a past reference time. The adverb *kuri* locates the (progressive) eventuality of the cricket eating its leaf relative to this past reference time. Consultants reject examples with *kuri* in contexts with a present reference time.

As expected, sentences in which *–ta* co-occurs with *kuri* receive an interpretation where the eventuality denoted by the verb (and its dependents) is located in the future of the past reference time. Additionally, a counterfactual implicature can arise. In the discourse context given in (35), for example, the speaker conveys that at a past time there was an expectation that it would rain in the relative future. The example also implicates that, although there was an expectation that it would rain, it did not rain. Evidence for this counterfactual implicature is that consultants will often offer a spontaneous continuation of examples where *–ta* and *kuri* co-occur that states the non-occurrence of the eventuality. After uttering (35), for example, several of my consultants offered the continuation in (35a) when asked to consider whether (35) was felicitous in the discourse context given. That this counterfactual implication is merely an implicature is shown by the fact that consultants will also accept continuations such as (35b), which asserts that it did, in fact, rain.

(35) Context: I am in Paraguay and wondering whether it will rain later today. A friend tells me that according to the weather report two days ago...
Kuehe o-ký**-ta** **kuri**.
yesterday A3-rain-FUT back.then
'It was going to rain yesterday.' [E]
a. ...ha nd-o-ky-i.
...and NEG-A3-rain-NEG
'...but it didn't rain.' [spontaneously volunteered]
b. ...ha o-ky.
...and A3-rain
'...and it rained.' [E]

(36) is a naturally occurring example where *–ta* and *kuri* co-occur. What is implicated here is that the girl lost her hand, but the remainder of the story shows that she did not lose it.

(36) Context: "When I cleaned her wound I tried not to show her how badly it looked."
O-ñe-hundí**-ta** chu-gui la i-po **kuri**
3-je-lose-FUT 3-ABL the B3-hand back.then
'She was going to lose her hand.' [C]

Both *kuri* and *va'ekue* are analyzed in Tonhauser (2006) as temporal adverbs that are anaphoric to a past reference time, similar to the English adverb *back then*. I assume here that the two adverbs shift the reference time to a past time. This analysis accounts for why *kuri* but not *kuehe* 'yesterday' can co-occur with *–ta* in out-of-the-blue contexts: in such contexts, *kuri* locates the reference time in the past of the utterance time but it does not affect the temporal relation between the eventuality time and the reference time, which is constrained by *–ta.* The adverb *kuehe* 'yesterday', on the other hand, locates the eventuality time at a time in the past of the reference time when it co-occurs with *–ta*; this conflicts with the constraint introduced by *–ta* that the eventuality time is in the future of the reference time. The co-occurrence of *kuehe* 'yesterday' and *–ta* is only possible (without *kuri*) in contexts like (33) where the reference time is in the past of the utterance time.

Previous researchers have called *kuri* a past tense (e.g. Nordhoff 2004) or a (recent) past marker (e.g. Gregores/Suárez 1967; Liuzzi/Kirtchuk 1989) since it requires a past time interpretation of the utterance it occurs with, cf. (34). Tonhauser (2006) argues that *kuri* and *va'ekue* are not past tenses even though they locate the reference time in the past of the utterance time since they are not part of the verbal paradigm but rather temporal adverbs (cf. also Tonhauser 2009c). Both *kuri* and *va'ekue* occur very infrequently in naturally occurring discourse and only in those contexts where past time reference is not sufficiently established contextually. This is the case at the beginning of stories where no past time has yet been introduced, as in (37a), and in contexts where the discourse context has shifted the reference time into the present or a more recent past; in such examples, *kuri* locates an eventuality at a previously mentioned (more distant) past time, cf. (37b).

(37) a. O-ĩ-je **kuri** upe kyju kapi'ipé-pe peteĩ ka'are-gúy-pe.
A3-be-SAY back.then that cricket grass-in one medicinal.plant-under-at
'It is said that there once was a cricket in grass under a medicinal plant.' [C]

b. Context: The boy and his dog gave up on catching the frog and went home.
Once at home, they are taking a bath, and the boy sees the frog sitting in the door.
The little boy says:
Mba'é-piko pea heta ña-ñe-ha'ã **kuri**
what-EMPH that much B1pl.incl-JE-try back.then
ja-guerú-haguã ñané-ndive.
A1pl.incl-bring-PURP B1pl.incl-with
'How much did we try to bring him with us (and now he comes voluntarily).' [C]

I analyze *kuri* as constraining the location of the reference time to a past time. In contexts like (37a) where no past time is contextually available, the existence of such a past reference time is accommodated.

(38) Lexical entry of *kuri*: *kuri* : S\S : $[[\lambda p_{\tau} [rt < now \,\&\, p]\,]]^{M,g,i,j,w}$

According to this semantics, (39a) is correctly interpreted as locating the reference time, relative to which the speaker's singing is located according to the Aktionsart of the proposition, at a time in the past of the utterance time, as illustrated in (39b).[12]

(39) a. A-purahei **kuri**.
A1sg-sing back.then
'I sang/was singing.' [E]

b. $[[(39a)]]^{M,g,i,j,w} = [[kuri(\text{NON-FUT}(a\text{-}purahei))]]^{M,g,i,j,w}$
$= [[kuri(sing'(sp)(rt, w^*) \,\&\, rt \leq now)]]^{M,g,i,j,w}$
$= [[rt < now \,\&\, sing'(sp)(rt, w^*)]]^{M,g,i,j,w}$

In examples where *–ta* and *kuri* co-occur, *kuri* outscopes *–ta* since *kuri* applies to expressions of category S. Consider the interpretation of the example in (35) in (40), where *kuri* also outscopes the temporal adverb *kuehe* 'yesterday' and thus correctly requires the raining eventuality to have been predicted to occur at a time within yesterday:

(40) $[[(35)]]^{M,g,i,j,w}$ is defined for a circumstantial modal base (with an ordering source that specifies the agent's intentions) or an epistemic modal base (with stereotypical ordering source). If defined,
$[[(35)]]^{M,g,i,j,w} = [[kuri(\text{–}ta(kuehe(o\text{-}ky)))]]^{M,g,i,j,w}$
$= [[kuri(\forall w' \, (w' \in best(MB,OS, \langle w^*, rt\rangle)$
$\rightarrow \exists t'(rt < t' \,\&\, rain'(t', w') \,\&\, t' \subseteq yesterday'_{now})))]]^{M,g,i,j,w}$
$= [[rt < now \,\&\, \forall w' \, (w' \in best(MB,OS, \langle w^*, rt\rangle)$
$\rightarrow \exists t'(rt < t' \,\&\, rain'(t', w') \,\&\, t' \subseteq yesterday'_{now}))]]^{M,g,i,j,w}$

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[12] Since *kuri* is acceptable in sentences with unmarked verbs and in sentences with verbs marked with *–ta*, I assume that *kuri* co-occurs (redundantly) with the NON-FUT operator in the interpretation of sentences like (39b) to be able to give a uniform analysis to *kuri.*

According to this analysis, (35) is true at the utterance time in the speech world if and only if the reference time is in the past of the utterance time and, in all worlds *w′* that are best with respect to the modal base and the ordering source in the speech world and at the reference time, there is a time *t′* in the future of the reference time and included in the denotation of *kuehe* 'yesterday' at which it rains. Since the actual world is not necessarily among the worlds quantified over (e.g. if the actual world is not one that develops stereotypically), (35) does not entail that it rained yesterday in the actual world but is not false in such a situation either. I argue that the counterfactual implicature arises from Grice's Maxim of Quantity 1 ("Make your contribution as informative as is required for the current purposes of the exchange") in this context where the (non)occurrence of rain is relevant. Here's how the hearer calculates the implicature: The (competent) hearer assumes that the speaker knows whether or not it rained yesterday (since (35) is uttered by a farmer) and knows that (35) asserts that there was an expectation that it would rain yesterday. The hearer also knows that the factual "It rained yesterday" would have been a more informative assertion in a more succinct form, and that the (competent) speaker knows this. The hearer can assume that the speaker knows that he infringed on the Manner Maxim (specifically "Be brief") by not uttering "It rained yesterday", and that he did this to avoid infringing on the Maxim of Quality 1 ("Say only what you believe to be true"); hence, if the (non-)occurrence of rain was relevant, the speaker presumably couldn't make the stronger assertion, i.e. the speaker must know that "It rained yesterday" is not true. The cooperative speaker can be assumed to know that the hearer can come to the conclusion that the speaker meant to convey that "It rained yesterday" was not true. Hence, the hearer also assumes that it did not rain yesterday.

In sum, Guaraní utterances in which the future marker *–ta* co-occurs with an adverb that locates the reference time in the past of the utterance time may give rise to a counterfactual implication. This is similar to English utterances like *(If Charlie had kept his king,) he might have won the game*, analyzed by Condoravdi (2002) as implicating a counterfactual interpretation on the basis of the past-shifting meaning of the perfect and the metaphysical (possibility) modal meaning of *might.* The counterfactual implicatures of these English and Guaraní utterances thus do not depend on the semantics of particular morphosyntactic expressions but can emerge cross-linguistically from the combination of related but slightly different meanings of language-particular expressions: the backward shift is expressed by an aspect marker in English and by a temporal adverb in Guaraní, and the forward shift by a (possibility) modal in English and a prospective aspect with a necessity modal meaning in Guaraní.

The next section concludes the paper by comparing Guaraní *–ta* to other future markers that express the modal meanings of intention and prediction.

5. The Guaraní Future Marker *–ta* in Cross-Linguistic Perspective

One of the key differences between Guaraní and European languages such as English is that Guaraní does not have tenses, i.e. paradigmatic expressions that locate the reference time with respect to the utterance time. One way in which this difference manifests itself is that the Guaraní future marker *–ta* can express future time reference from the perspective of both past and present reference times, while e.g. English has the future auxiliaries *will* and *would*, which are generally analyzed as differing in their tense contribution (e.g. Abusch 1997, 1998; Kaufmann 2005). Another difference between Guaraní *–ta* and the English auxiliary *will* is that although both can convey the modal meanings of intention and prediction, *–ta* is more limited than *will.* As illustrated in section 3.1, *–ta* does not realize future time reference with deontic modality, and the elicited examples in (41) to (43) show that *–ta* also does not realize present time reference with epistemic or dispositional modality. (Such meanings were also not attested in naturally occurring data.) Take (41): English *will*, just like German *wird* and the Spanish synthetic future, can be used in the context of (41) to express that the child is at the friend's house at the utterance time in the worlds epistemically accessible from the perspective of the speaker. Guaraní *–ta* is judged unacceptable in this context, cf. (41d); instead, the modal markers *–ne* '-MIGHT' or *–va'erã* '-MUST' are used, as illustrated in (41e).

(41) Context: I try to soothe my friend whose child hasn't come home from school yet.
a. He**'ll** be with his friend.
b. Estar**á** con su amigo. (Spanish)
be.3.FUT with his friend
'He'll be with his friend.'
c. Er **wird** bei seinem Freund sein. (German)
he will at his friend be
'He'll be with his friend.'
d. #Oi-mé**-ta** iñ-angirû-ndive. (Guaraní)
A3-be-FUT B3-friend-with
(Intended: He'll be with his friend.) [E]
e. Oi-mé**-ne**/Oi-me**-va'erã** iñ-angirû-ndive. (Guaraní)
A3-be-MIGHT/A3-be-MUST B3-friend-with
'He might/must be with his friend.' [E]

(42) presents another example of this kind:

(42) Context: We know that Paula, the neighbor, has a gun. From time to time she shoots into the sky to scare off people and animals. A consultant and I are sitting in front of the house working when we hear a gun shot. My consultant says:
a. Páula**-ne** hĩna.
Paula-might PROG
'That might be Paula.' [E]
b. #Páula**-ta** hĩna
Paula-FUT PROG
(Intended: That'll be Paula.) [E]

English *will* and its past tense version *would* are also compatible with a dispositional conversational background, such as the English translation in (43a) (cf. Palmer 1987, Sarkar 1998, Copley 2002). In Guaraní, this meaning is conveyed with an unmarked verb (43a) and my consultants reject the version in (43b) where the verb is marked with *–ta*.

(43) Context: When my sister was small she had a strange habit.
a. Oi-ke mesa-guý-pe ha o-herei mesa-guy.
A3-enter table-under-at and A3-lick table-under
'She sat/would sit under the table and lick its underside.' [E]
b. #Oi-ké**-ta** mesa-guý-pe ha o-herei mesa-guy.
A3-enter-FUT table-under-at and A3-lick table-under
(Intended: She would sit under the table and lick its underside.) [E]

Guaraní *–ta* shares the inability to express present time reference with the St'át'imcets future marker *kelh*, a second position clitic analyzed in Matthewson (2006) and Matthewson et al. (2006). Guaraní *–ta* and St'át'imcets *kelh* also share the property of realizing future time reference in both present and past contexts, as illustrated for St'át'imcets in (44a,b) and (44c), respectively:[13]

(44) St'át'imcets
a. matq kelh [kw s-Mary]
walk WOLL [DET NOM-Mary]
'Mary will walk.' (Matthewson 2006:691)
b. sáy'sez'-lhkán kelh
play-1SG.SUBJ *kelh*
'*I played/*I am playing/I will play.' (Matthewson 2006:678)
c. Context: Dad and Uncle Jack were talking to Uncle Ben. They all decided that the men and John would go out to the fish rock in the morning and catch some salmon.
nilh *kelh* aylh s-wa7-s ts'zús-wit k'úl'-em ku
FOC WOLL then NOM-IMPF-3POSS busy-3PL make-MID DET
cwík'-em-alhcw i sqáycqyecw-a
butcher.fish-MID-place DET.PL man(PL)-DET
'After that, they would get busy building the new drying rack.'
(Narcisse 1994:4, as given in Matthewson 2006:692)

Matthewson (2006) analyzes *kelh* as a future-oriented modal since it patterns with other modals in the language in being compatible with both existential and universal quantificational force, and lexically specifying the conversational background. In Matthewson et al. (2006), *kelh* is analyzed as presupposing a circumstantial conversational background:

(45) $[[kelh\ \varphi]]^{w,t,c}$ is only defined if B(c) is circumstantial.
If defined, $[[kelh\ \varphi]]^{w,t,c} = 1$ iff for all/some worlds $w' \in B(c)(w, t)$, there is a time $t' > t$ such that $[[\varphi]]^{w',t',c} = 1$.

A difference between this analysis of *kelh* and that of Guaraní *–ta* is that the former is only felicitous in contexts with a circumstantial conversational background and that, according to Matthewson (2006:701), "*kelh* does not convey mental states such as expectation, desire or intent". But examples like those in (44a) and (44b) suggest that St'át'imcets *kelh* is at least compatible with the modal meanings of prediction/expectation and intention**,** respectively. Whether this is the case, or *kelh* perhaps even entails these meanings like Guaraní *–ta,* is a question for future research.

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[13] Matthewson (2006) explains the following glosses for the St'át'imcets examples: DET = determiner, IMPF = imperfective, MID = middle, NOM = nominalizer, PL = plural, POSS = possessive, SG = singular, SUBJ = indicative subject.

To conclude, future markers differ cross-linguistically in (i) which modal meanings they are compatible with (or entail), and (ii) whether future time reference is entailed or not. Comparing the temporal and modal meanings of English *will/would*, St'át'imcets *kelh* and Guaraní *–ta* shows that the meaning of *–ta* is the most restrictive of these future markers since *–ta*, unlike *will/would*, entails future time reference and is only compatible with the modal meanings of intention and prediction/expectation, and, unlike *kelh*, only has universal quantificational force. Thus, exploring the semantics of Guaraní *–ta* has revealed yet another way in which future time reference and modal meaning can be bundled together in a natural language future marker. This result from Guaraní contributes to our (growing) picture of what is (im)possible in (future) temporal and modal reference in natural languages. Many more detailed formal semantic studies of future markers in a typologically diverse set of languages are needed, however, to develop truly cross-linguistic theories of (temporal) semantics and assess the cross-linguistic applicability of existing theories.

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Hamida Demirdache & Oana Lungu

Zero-Tense *vs*. Indexical Construals of the Present in French L1[1]

1. Introduction

Ogihara (1999, 2008) contends that Japanese has two presents: an indexical present and a zero-present. On the basis of an experimental investigation of the construals of *present* under *past* in child French, we argue that French children, just like Japanese adults, but unlike French adults, also have two presents: an indexical present and a zero-present. The evidence for a zero-present in their grammar is compelling: children allow, just like Japanese speakers, but unlike French speakers, pure simultaneous construals of present under past, where the present denotes an interval that lies completely in the past, be it in relative or complement clauses.

We further show that while children accept the present on a double access construal in both complement and relative clauses, they reject it on a pure indexical construal in relative clauses. These finding are surprising since, on both construals, the present is utterance-indexical. We suggest an account for why children reject pure indexical construals of the present based on a scopal analysis of tense in relative clauses together with the *Observation of Isomorphism,* according to which children show a strong bias for surface scope (isomorphic) interpretations. On our proposal, children must have acquired the condition that prohibits an indexical present from appearing in the scope of past in the adult grammar. We consider two candidates for such a condition: the anti-past polarity analysis of the present (Stowell 1995, Anand/Hacquard 2007) which constrains the occurrence of indexical presents in embedded contexts, and the *Upper Limit Constraint* (Abusch 1993), which constrains the reference of embedded tenses. We argue that only a constraint on the reference of an embedded present allows us to draw exactly the distinction we want between the double access reading of the present in complement and relative clauses, which children accept, and the pure indexical reading of the present in relative clauses, which children reject.

We conclude that French children have both the Japanese and the French setting for the sequence of tense (henceforth, SOT) parameter since they allow simultaneous construals of both *present* and *past* under past. The proposal that children allow multi-valued settings of parameters is expected under a *Multiple Grammar* approach to language acquisition. We suggest that our proposal for French L1 extends to Japanese L1 in so far as Japanese children have been argued to allow simultaneous readings of past under past, although this reading is unavailable in the target grammar (Matsuo/Hollebrandse 1999).

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2. Present under Past in Subordinate Clauses

We start by discussing the construal of present under past in embedded complement and relative clauses in SOT languages, such as English and French, *vs.* non-SOT languages such as Japanese.

2.1. Present under past in SOT languages

Consider first complement clauses. As is well known, the use of a present in a complement clause under a past in the matrix gives rise to a *Double Access* (DA) construal (Abusch 1991, Ogihara 1996) in SOT languages: the embedded present is required to denote an interval that includes both the past matrix event-time and the time of utterance. Thus, the sentences in (1) are acceptable only if the utterance that is being reported was about an interval that includes both the time of saying and the time of the actual utterance. Rosa's crying is thus understood as overlapping both the time of Max' saying and the utterance-time of (1).

(1) a. Max said that Rosa is crying.
    b. Max a dit que Rosa pleure.
(2) a. Max kissed the girl who is crying.
    b. Max a embrassé la fille qui pleure.

When present in a relative clause is embedded under a matrix past ((2)), it is also required to denote an interval that overlaps the time of the actual utterance. However, in this case, it need not also overlap the past matrix event-time. Thus, in the relative clauses in (2), the girl's crying is required merely to hold at the time of utterance.

In sum, in SOT languages, a present embedded under a matrix past is always utterance-indexical: it must denote an interval that includes the utterance-time, be it in relative clauses, or in complement clauses where it is required to denote a larger interval, including both the time of utterance and the time of the event described by the main clause, yielding the DA reading.

2.2. Present under past in non-SOT languages

In contrast, in non-SOT languages such as Japanese, present in a subordinate clause embedded under a matrix past can express temporal simultaneity between the subordinate and matrix situation-times, as illustrated with the following examples.[2]

(3) a. John-wa Mary-ga ninsinsi-te i-ru to it-ta
John-TOP Mary-NOM pregnant-PROG-PRES COMP say-PAST
'John said that Mary was pregnant.' (Simultaneous only)
b. Taroo-wa [nai-te i-ru otoko]-o nagut-ta
Taroo-TOP cry-PROG-PRES boy-ACC hit-PAST
'Taroo hit a/the man who was crying (at that time).' (Simultaneous present)
'Taro hit the man who is crying (now).' (Indexical present)

Notice that when the embedded clause is a complement clause, as in (3a), present under past only yields a *pure simultaneous* construal, where the time of Mary's pregnancy overlaps the past time of John's saying. However, when the embedded clause is a relative clause, as in (3b), present under past yields both a pure simultaneous construal, where the time of the man's crying overlaps the time of Taroo's hitting him, and a *pure indexical* construal, where the man's crying holds at speech-time.

Summarizing so far. Present under past in SOT languages is always indexical. This is why the situation described by the English and French complement/relative clauses in (1)-(2) can only be understood as holding at utterance-time – irrespective of whether or not the subordinate situation-time *must* (as is the case of complement clauses) or *may* (as is the case in relative clauses) extend into the past to include the matrix event-time. In contrast, in non-SOT languages, present embedded under a matrix past either enforces (as is the case with complement clauses) or allows (as is the case with relative clauses) a purely simultaneous reading. This pure simultaneous construal of present under past, the default construal in languages such as Japanese, is unavailable in languages like English or French where a morphological (imperfective) *past* is required in order to express temporal simultaneity, as illustrated with the sentences in (4).

(4) a. Max said that Rosa was crying.
b. Max a dit que Rosa pleurait.

Note that the complement clauses in (4) allow a simultaneous construal, as well as a past-shifted construal where the time of Rosa's crying is past-shifted relative to the past time of Max' saying.

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[2] All Japanese examples are quoted from Ogihara (1995, 1996).

3. On the Analysis of the Present in Embedded Contexts

The aim of this section is not to provide a review of the extensive literature on SOT but merely to introduce the ingredients of the various analyses in the literature that will be relevant to account for the construals of present in child French reported in this paper.

3.1. Indexical present

We have just seen that one difference between SOT languages, such as English/French, and non-SOT languages, such as Japanese, is that, in the former, present in a relative clause under a matrix past is always utterance-indexical, whereas in the latter, it is ambiguous between a simultaneous and an indexical interpretation. In order to account for this difference, Stowell (1995), Ogihara (1996) propose a movement analysis. On this analysis, indexical interpretations of tenses are always obtained by moving the constituent that contains the indexical (present) tense to a position higher than the matrix (past) tense, since this is the only way the embedded tense can escape from the scope of the matrix past and thus have access to the utterance time.

Adapting Stowell's (1995) original proposal, Anand & Hacquard (2007: 218) justify the movement by formulating a constraint on present under past in terms of polarity. Present tense is an anti-past polarity item and, as such, must escape from the scope of past tense:

(5) *Tense polarity*: PRES cannot be c-commanded by PAST

Note that (5) is a condition on the distribution of semantic (present) tense (written as PRES to avoid ambiguity).[3, 4] Movement is obligatory in English/French, where present is *always* indexical[5] and thus subject to the polarity constraint in (5), but not in Japanese, where present is *sometimes* indexical.

Let's see how this analysis would account for the English *vs*. Japanese relative clause distinction. Consider first the English-example in (2a) repeated below as (6a):

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[3] Stowell distinguishes morphological tense from semantic tense. In his system, it is present morphology that is subject to a polarity requirement: it cannot occur in the scope of PAST. Unlike Stowell, Anand/Hacquard do not separate present/past morphemes from their corresponding semantic tense heads.

[4] For Abusch (1991), Ogihara (1996), Kratzer (1998) or von Stechow (1995), the constraint on present under past is restricted to intensional contexts. Thus, Ogihara (1996: 211) puts forth a constraint prohibiting the time of utterance (and more-generally all speech-time oriented indexicals) from appearing in the semantic scope of an attitude verb. For the other authors, there is a constraint prohibiting free/deictic tenses in attitude environments. In von Stechow's system, this constraint is satisfied if either the embedded tense in an attitude context is syntactically moved out of the scope of the attitude operator, and thus read *de re* (see discussion in the text below of the DA reading of complement clauses), or is a zero/bound tense (section 3.2).

[5] The conclusion for many authors is that the indexicality of the English present is lexically encoded: present is required to denote a time that overlaps the utterance-time (see Ogihara 1996 or Abusch 1993 among others).

(6) a. Max kissed the girl who is crying
b. $[_{IP1}$ $[_{VP1}$ PAST kiss $[_{DP}$ $[_{RC}$ $[_{IP2}$ PRES crying]]]]]
Temporal polarity requirement on PRES ((5)) violated

The present in the relative clause in (6a) cannot be licensed *in-situ*: if it remains in the scope of the matrix past at LF as in (6a), a violation of (5) ensues. The temporal polarity requirement on the present can, however, be satisfied if the DP containing the relative clause Quantifier Raises at LF out of the scope of the matrix tense, adjoining to the matrix clause, as in (6c).

c. $[_{IP1}$ $[_{VP1}$ PAST kiss $[_{DP}$ $[_{RC}$ $[_{IP2}$ PRES crying]]]]]

Consider now the Japanese example in (3b), repeated below in (7a) and recall that, unlike English, Japanese present tensed relative clauses embedded under a matrix past allow two interpretations: an indexical interpretation (as is the case in English) and a simultaneous interpretation.

(7) a. Taroo-wa [nai-te i-ru otoko]-o nagut-ta
Taroo-TOP cry-PROG-PRES boy-ACC hit-PAST
'Taro hit the man who is crying now.' (Indexical present)
'Taroo hit a/the man who was crying (at that time).' (Simultaneous present)
b. Indexical/*independent* present
[[[cry PRES $_{IP2}$] $_{RC}$] $_{DP}$]$_1$ [[t_1 hit PAST $_{VP1}$] $_{IP1}$]
c. Simultaneous/*dependent* present
[[[[[cry $Ø^{PRES}$ $_{IP2}$] $_{RC}$] $_{DP}$] hit PAST $_{VP1}$] $_{IP1}$]

Note that, on this analysis, the polarity requirement on the present in (5) is satisfied in (7b) since the subordinate present is not in the scope of the matrix past at LF, but does not apply to (7c) since the subordinate clause is tenseless.

This scopal account of the temporal construals of relative clauses nicely predicts a correlation between the licensing properties of tense in relative clauses and the readings available for relativized DPs in English *vs*. Japanese. Thus, consider the English sentence in (8a) from Heim (1994). The proposal that present is an anti-past polarity item forces a wide scope, *de re* reading for the object DP in (8a) and this is, indeed, the only reading available for this English sentence.

(8) a. John was looking for a man who lives next door. (Heim 1994: 163)
b. Taroo-wa [Tookyoo-ni sunde i-ru hito]-o sagasi-ta
Taroo-TOP Tokyo-DAT live-PROG-PRES person-ACC seek-PAST
'Taroo looked for a person who lived in Tokyo (at that time).'

In contrast, in the Japanese sentence in (8b), a wide scope, *de re* reading for the object DP, although available, is not enforced as is the case in English.[6] That is, the object relativized DP in (8b) can be construed *de dicto* —but only on a simultaneous construal of the present inside the relative clause, as the gloss provided indicates. The *de dicto* construal arises when the object DP is interpreted *in-situ* at LF, within the intensional argument of the matrix predicate. This derivation yields a temporally dependent construal of the relative clause, where the subordinate present is a zero-tense. (And since there is no semantic present tense at LF inside the relative clause on this construal, the polarity condition in (5) would fail to apply).

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[6] In Ogihara's system, a de *re* construal arises when the object DP QRs out of the VP. Adjunction of the relativized DP in (8b) to the matrix VP yields a simultaneous construal of the embedded present (since the latter is still scopally dependent on the matrix past tense), while adjunction to the matrix IP yields an indexical construal of the present (since the latter is scopally independent of the matrix past tense).

Let's now turn to the DA construal of a complement clause such as (1), repeated below as (9a). Again, the configuration in (9b) will not yield a well-formed LF, unless the embedded present escapes the scope of the matrix past.

(9) a. Max said Rosa is crying.
b. [$_{\text{IP1}}$ Max PAST say [$_{\text{IP2}}$ Rosa PRES crying]]
Temporal polarity requirement on PRES violated

Anand/Hacquard (2007) adopt Abusch' and Ogihara's proposal that indexical tenses are interpreted *de re* in attitude contexts. On this proposal, the subordinate embedded present is syntactically moved outside the scope of the attitude operator and is thus read *de re*. Covert *res* movement of the present all the way to the matrix level rescues it from a violation of the temporal polarity requirement in (5), as schematized in (10):

(10) [PRES$_1$ ... PAST ... [$_{\text{CP}}$ ... t_1 ...]]

This analysis alone, however, does not suffice to explain the DA reading that present under past in complement clauses yields. What constraint forces the indexical present to denote an interval that *also* overlaps the time of Max' saying in (9)? The obligatoriness of the DA reading follows from Abusch' *Upper Limit Constraint*:

(11) *Upper Limit Constraint* (ULC)
"The tense of the embedding clause is an upper bound on the tenses in subordinate clauses." (Abusch 1993)

The ULC prohibits the time denoted by the tense of the complement clause in (9) from completely following the time denoted by the tense of the matrix clause. In other words, the present time of crying cannot completely follow the past time of saying. Unless the interval at which Rosa is crying also includes the time of Max's saying, the sentence in (9) is bound to violate (11).

The reader should bear in mind that, while the polarity requirement in (5) constrains the distribution of an indexical present, the ULC constrains the reference of an embedded indexical present. To see the difference this makes, consider again the relative clause in (2)/(6), repeated below as (12a). While (5) rules out the representation in (12b) altogether, the UCL allows a DA construal of the embedded present in (12b), but rules out the purely indexical construal of the present, where the girl's crying holds at utterance-time and completely follows the past time of Max' kissing her.

(12) a. Max kissed the girl who is crying.
b. [$_{\text{IP1}}$ PAST kiss [$_{\text{DP}}$ [$_{\text{RC}}$ [$_{\text{IP2}}$ PRES crying]]]]
Violates the polarity requirement ((5))
Satisfies the ULC ((11)) on a DA construal of PRES

3.2. Zero-tense

As we saw in our discussion of the English/French complement clauses in (4), in order to express temporal simultaneity with a past matrix event, SOT languages require a past tense in the subordinate clause. Ogihara proposes that languages like English have an (optional) tense deletion or SOT rule that deletes an embedded (past) tense at LF when it is locally c-commanded by another (past) tense. As a consequence of tense deletion applying to (4a)/(13a), yielding (13b), the subordinate event is obligatorily construed as co-temporal with the matrix past event.

(13) a. Max PAST say that Rosa PAST be crying
b. Max PAST say that Rosa $\varnothing^{PAST}$ be crying

Japanese does not have such a rule. As a consequence, past under past configurations only yield shifted construals, as illustrated with the complement clause in (14) which yields a past-shifted construal, but not the simultaneous construal available in (4)/(13).

(14)	John-wa	Mary-ga	ninsinsi-te i-ta	to	it-ta
	John-TOP	Mary-NOM	pregnant-PROG-PAST	COMP	say-PAST

‘John said that Mary was pregnant.’ (Past-shifted only)

Temporal simultaneity in Japanese can only be expressed by the present. Recall from our discussion of present under past relative clauses in section 3.1, that for Ogihara Japanese has two presents: a *zero* present, alongside the indexical present we find in English. The Japanese example in (15a) will be analyzed as in (15b):[7]

(15)	a.	John-wa	Mary-ga	ninsinsi-te i-ru	to	it-ta
		John-TOP	Mary-NOM	pregnant-PROG-PRES	COMP	say-PAST

‘John said that Mary was pregnant.’ (Simultaneous only)

b. [[[pregnant $\varnothing^{PRES}{}_{IP2}$] say $_{VP1}$] PAST $_{IP1}$]

Since (15b) yields the semantically right tense configuration for a simultaneous reading, there is no need for a tense deletion rule in Japanese. In contrast, Ogihara contends, in English, there is no such option: all sentences in the present tense are tensed (that is, bear an indexical present). An SOT rule is thus required in order to allow for simultaneous construals.

To account for the simultaneous construal of past under past in English-like languages, Kratzer (1998) puts forth the *zero-tense* hypothesis, which in some sense extends Ogihara's tense deletion analysis of the Japanese present to the past in SOT languages.

Kratzer adopts a referential theory of tense, where tenses are pronouns. Just like pronouns, tenses allow indexical, anaphoric or bound variable construals. Past and present tense morphemes are temporal variables saturating the time-argument position of their predicate. Temporal features ([PAST]/[PRES]) contribute presuppositions constraining the choice of possible referents for time-variables, just like the *phi*-features [MALE]/[FEMALE] contribute presuppositions restricting the denotation of an individual variable to male/female individuals. The feature [PRES] on a time-variable contributes a presupposition restricting its denotation to the time of the context (speech-time in an independent clause), while [PAST] on a time-variable restricts its denotation to times falling before the time of the context.

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[7] On the assumption that Japanese has an indexical present, we expect (15a) to also allow a DA reading. Ogihara (1999) argues that Japanese complement clauses indeed have DA interpretations but that this fact is obscured “because a pure simultaneous interpretation is always available with exactly the same sentence”.

Kratzer argues that the inventory of tenses in an SOT language includes a zero-tense alongside indexical (past and present) tenses. A zero-tense is a time variable carrying no presuppositions, that must be bound by a local antecedent. Zero-tenses are the temporal analogue of zero-pronouns (that is, pronouns without *phi*-features). The simultaneous construal of past under past in SOT languages arises when the embedded tense is generated as a zero-tense. The latter gets pronounced as a past tense via a PF agreement mechanism with its antecedent, the matrix past.

We adopt Kratzer's zero-tense hypothesis here. To accommodate non-SOT languages under Kratzer's proposal, we assume the following parametric choice for the morphological realization (pronunciation) of zero-tenses across languages.

(16) a. *Non-SOT languages*
The morphological features of a zero-tense are the default/unmarked features.
b. *SOT languages*
The morphological features of a zero-tense are determined via PF-agreement (between the embedded tense and the matrix tense).

(16a) yields the simultaneous reading of *present* under past in non-SOT languages, since present is typically not overtly marked and is thus the default, morphologically unmarked tense form. (16b), in turn, yields the simultaneous reading of *past* under past in SOT languages. On this proposal, both SOT and non-SOT languages have indexical past and present tenses alongside a zero-tense. Zero-tense surfaces as present in non-SOT languages but as past in SOT language.

With this background in mind, let's now turn to the experimental conditions designed in order to investigate the construal of present under past in child French.

4. Present under Past in French Child Language

Fourteen 5 to 7 year old monolingual French children participated in the experiment, which was carried out in kindergartens in Nantes. Each child was tested individually during two twenty-minute sessions recorded on different days. The task was a Truth Value Judgment Task involving two experimenters, one acting out the stories with toys and props, the other playing the role of a puppet, Koko, a purple koala coming from another planet, listening to the stories acted out together with the child. At the end of each story, Koko utters the test sentence. The task for the child was to judge whether or not the statement made by Koko was true or false and, further, to reward/punish Koko by giving him different colored tokens according to whether or not s/he judged Koko's statement to be acceptable in the context provided.

Before proceeding, two remarks on the past tense forms used in our study. First, the past tense form in the matrix clause in all the test sentences is the *passé composé*. The so-called simple past (*passé simple*) was avoided since it is highly marked in spoken French, having been usurped by the *passé composé* to convey perfective viewpoint for sentences with past-time reference. Second, since simultaneous past under past construals require an imperfective past in the embedded clause, the past tense form used in subordinate clauses was uniformly the *imparfait*, the main imperfective viewpoint for sentences with past-time reference in French.[8]

The experimental study we carried out was designed to investigate the construal of both present and (imperfective) past in both relative and complement clauses under a matrix past. The focus of this paper, however, is the (surprising) construals of present under past. We thus mention our results for past under past only when they bear on our arguments (but see Demirdache/Lungu 2008 for discussion).

4.1. The experimental conditions

Simultaneous and non-simultaneous construals of present under past were tested under the three different experimental conditions presented below.

4.1.1. Simultaneous present: the purely simultaneous and the DA conditions

Simultaneous construals of relative and complement clauses were tested under two different experimental conditions which we refer to as the *purely simultaneous condition* and the *Double Access (DA) condition*.

The purely simultaneous condition provides a context that makes the simultaneous – but *not* the DA – construal of present under past *true*. That is, where the time of the state described by the subordinate clause overlaps the time of the event described by the matrix clause, but *no longer holds* at the time of utterance. The contexts designed for purely simultaneous construals of relative and complement clauses are illustrated with the stories given in (17) and (18), respectively.

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[8] So-called viewpoint/grammatical aspect provides a temporal perspective (viewpoint) on the described situation (independent in principle of its temporal location). Roughly, imperfective viewpoint presents a situation as ongoing (relative to a reference-time), while perfective viewpoint presents a situation as completed (relative to a reference-time).

The role of viewpoint aspect in determining temporal ordering is illustrated in (i) *vs.* (ii). The complement clause in (i), with an embedded past progressive (imperfective viewpoint), allows a simultaneous construal, as well as a past-shifted construal (in the appropriate context). In contrast, (ii) with an embedded simple past non-stative predicate (perfective viewpoint) precludes the simultaneous construal.

(i) Rosa said Zooey was eating her kibbles. (Simultaneous or past-shifted)
(ii) Rosa said Zooey ate her kibbles. (Past-shifted only)

(17) *Relative clause – Purely simultaneous condition*
There are two birds in this story, one on the floor, the other in a roofless car. Ann gives the bird in the car a piece of bread. The bird then flies away.

a. *Koko*: I'm not sure I understood. Where is the bird, now?
b. And where was he before?
c. *Exp.*: OK, Koko, so tell me what happened in the story.
d. *Koko*: Anne a donné un morceau de pain à l'oiseau qui *est* dans la voiture.
'Ann gave a piece of bread to the bird that *is* in the car.'

In the context provided in (17), the bird Ann fed was in the car at the time of her feeding but is no longer in the car at the time of Koko's utterance in (17d). In order to ascertain that the child has followed the sequence of events acted out, Koko first asks the child the two control-questions in (17a-b), then, utters the test sentence in (17d).

(18) *Complement clause – Purely simultaneous condition*
Pierre is playing with his coins in the garden. Mummy arrives and says: «Oh, la la! What a mess! Put all your things away!» Pierre puts his coins in the trunk.

a. *Pierre*: Look, Mummy, the coins *are* in the trunk!

Later, his sister, Ann, arrives and look what she does! She empties the trunk. Oh, what a nasty girl! *Now, all the coins are on the grass!*

b. *Koko*: Pierre a dit que les pièces *sont* dans le coffre.
'Pierre said that the coins *are* in the trunk.'

(18) illustrates the context used to test the purely simultaneous construal of complement clauses: although the coins were in the trunk at the time of Pierre's saying, they are no longer in the trunk when Koko utters the test sentence in (18b).

Now, since the French present is utterance-indexical, it cannot denote an interval that lies completely in the past. The contexts provided under the purely simultaneous condition ((17-18)) thus make a reading of present under past, *unavailable* in the adult grammar, *true*. We therefore expect children to reject this reading of the present for the test sentences in (17d)/(18b), if they have acquired the lexical requirement for the French present.

In contrast, under the DA condition, the state described by the embedded clause overlaps the past time of the matrix event – but *still holds* at the time of utterance. Thus, in the DA context provided in (19) for a relative clause, the rabbit Mummy fed was near the mushrooms at the time of her feeding and is still near the mushrooms at the time of Koko's utterance in (19b).

(19) *Relative clause – DA condition*
There are two rabbits in this story, one near the tree, and the other near the mushrooms. Mummy feeds the one near the mushrooms.

a. *Exp.*: Koko, tell me what happened in the story.
b. *Koko*: Maman a nourri le lapin qui *est* près des champignons.
'Mummy fed the rabbit that *is* near the mushrooms.'

In (20), we illustrate the context provided for a complement clause under the DA condition. Again, the embedded state holds at the time of the matrix event and *still holds* at utterance-time – that is, the coins are still in the trunk when Koko utters the test-sentence in (20b).

(20) *Complement clause – DA condition*
Pierre is playing with his coins. Mummy arrives and says: «Oh, la la! What a mess! Put all your things away!» Pierre puts his coins in the trunk.

a. *Pierre*: Look, Mummy, the coins *are* in the trunk!
b. *Koko*: Pierre a dit que les pièces *sont* dans le coffre.
'Pierre said that the coins *are* in the trunk.'

Since the contexts provided under the DA condition make a reading of present under past, *available* in the adult grammar, *true*, we expect children to accept this reading of the present for the test sentences in (19b)/(20b).

Recall, finally, that while DA is the only construal available for present in complement clauses, present in relative clauses also allows purely indexical, non-simultaneous readings. Our third experimental condition was designed to test precisely this construal.

4.1.2. Non-simultaneous present: the purely indexical condition for relative clauses

To test the non-simultaneous construal of present under past in relative clauses, we set up contexts where the state described by the relative clause in the target sentence holds at the time of utterance, but not at the past time of the matrix clause. On this purely indexical reading of the present, the time of the embedded clause is *forward-shifted* relative to the past time of the matrix clause, as illustrated with the temporal diagrams in (21a)/(22a).

(21) *Non-simultaneous RC with a present state*

```
                               UT-T
a. —[———]———[——|———]——>
       PETTING          CAT ON CHAIR
```

b. There are two cats, one near the mushrooms, the other in the basket. Ann pets the cat near the mushrooms, who later on jumps on the chair.
c. *Koko*: Anne a caressé le chat qui *est* sur la chaise.
'Anne petted the cat that *is* on the chair.'
d. "Non ! Le chat était pas sur la chaise. Anne, elle l'a caressé, il était près des champignons." [Malo 5;04]
'No! The cat was not on the chair. Anne, she petted him, he was near the mushrooms.'

In the story acted out in front of the child given in (21), Anne pets a cat that later jumps on a chair. As the child's answer in (21d) clearly shows, (21c) is rejected because the child enforces a simultaneous reading of the test sentence in (21c) and this reading is false in the context provided since the cat was not on the chair at the time of Anne's petting him.

(22) is an excerpt of the story designed for the non-simultaneous forward-shifted construal of the present with an activity verb in the relative clause. Yet again, the child's justification in (22d) makes it clear that the test sentence uttered by Koko in (22c) is rejected because the past matrix event fails to overlap with the present subordinate state.

(22) *Non-simultaneous RC with a present activity*

UT-T
a. ——[———]—————[——|——]——>
KISSING READING

b. A girl is in the garden. Pierre comes, kisses her and then leaves. The girl then starts reading.
c. *Koko*: Pierre a embrassé la fille qui *lit*.
'Pierre kissed the girl that *is* reading.
d. "Non! Quand il l'a embrassée, elle était dans le jardin." [Louis 6;02]
'No! When he kissed her she was in the garden.'

4.2. Results

Our experimental findings for the construals of present under past in relative and complement clauses are given in the table below. Unexpected results are bolded.

(23) *Present under Past in relative and complement clauses*

	Relative Clauses		Complement Clauses	
	Children	Expected	Children	Expected
Purely simultaneous	**80% yes**	no	**96% yes**	no
Double Access	100% yes	yes	62,5% yes **31,25% no** 6,25 ∅-responses	yes
Non simultaneous/purely indexical	**84% no**	yes		

Notice, first, that our findings for the purely simultaneous condition are surprising. That is, the children *accepted* the present under the purely simultaneous condition at a significantly high rate, *80%* for relative clauses and *96%* for complement clauses, and these results are unexpected given that the French present is indexical. A past imperfective tense form (the *imparfait*) is required to express temporal simultaneity (see discussion of French (4) *vs*. Japanese (3)).[9]

The second surprising finding concerns the non-simultaneous/purely indexical condition: the results for this condition are strikingly poor (children reject a forward-shifted/purely indexical present 84% of the time).

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[9] Note that the results for the purely simultaneous construal of the *imparfait* were target-like: the French imperfective past was accepted on this construal 90% of the time in relative clauses and 100% of the time in complement clauses (for an excerpt of the protocol, see (35)-(36) below in the text). We conclude that French children have the adult setting of the SOT parameter since they allow an imperfective past to express temporal simultaneity. We return to this point in section 8, where we discuss the SOT parameter setting in French child grammar.

In sum, children *accept* the purely simultaneous construal of present under past, unavailable in the adult grammar, while *rejecting* the non-simultaneous/purely indexical construal of present in relative clauses, available in the adult grammar. What does this surprising pattern in the construal of present under past tell us about the grammar of (embedded) tense in (French) child language?

Note, finally, that our findings for the present under the DA condition are also surprising: while the present in a DA context was accepted 100% of the time in relative clauses, some children (unexpectedly) rejected it in complement clauses, as the 31,25% rejection rate shows (notice also the 6,25% of zero/lack of responses). What is the source of this asymmetry? Why do some children accept the present on a DA construal in relative but not complement clauses?[10]

5. Zero-Present in French Child Grammar

Consider again the results for the present under the purely simultaneous condition, starting with the relative clause case. In the context provided in (17), an *indexical* present is infelicitous for the test sentence 'Anne gave a piece of bread to the bird that is in the car' ((17d), repeated as (24a)), since at the time of Koko's utterance, the bird is no longer in the car. In other words, *only* a zero-tense construal of the present is acceptable in this context. On the zero-tense analysis of the present in (24b), for the test sentence (24a)/(17d), the present is non-indexical – that is, does not express simultaneity relative to the time of speech.

(24) a. Ann gave a piece of bread to the bird that *is* in the car.
b. Ann PAST$_1$ give a piece of bread to the bird that $\varnothing_1^{\text{PRES}}$ be in the car.

Now, although the French present is utterance-indexical, the non-indexical/zero-tense construal in (24b) was accepted 80% of the time. Consider next the complement clause case. The context provided in (18) does not satisfy the truth conditions for a DA construal of the test sentence 'Pierre said that the coins *are* in the trunk' since the speaker/Koko knows that the state described by the complement clause is false at the time of his report and, moreover, that Pierre would carry out the same judgment. The present in the test sentence would thus only be felicitous on a non-indexical, simultaneous construal, which again is not available in adult French. Nonetheless, French children accepted this construal of the present 96% of the time.

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[9] In contrast, there is no asymmetry with the *imparfait* under the DA condition: it was accepted 100% of the time in both complement and relative clauses (for an excerpt of the protocol, see (32) below in the text). This result is also expected: the *imparfait* has no completion entailment (since it presents a situation as ongoing, open-ended) and, as such, can be used to report that a state was true at a past time, irrespective of whether the described state is still ongoing at UT-T, as is the case under the DA condition.

To explain this unexpected result, could we conjecture that children accept the present in this context because it is the tense form used in the direct speech (that is, Pierre says: «The coins are in the trunk.»)? This cannot be right for the following two reasons.

First, this conjecture fails to explain why children also accept the purely simultaneous construal of the present in relative clauses (80% acceptance rate), since there is no issue of transposing from direct to indirect discourse in *relative* clauses. On the other hand, the hypothesis that French children have a non-indexical, tenseless present accounts for the purely simultaneous construals of present, be it in relative or complement clauses. Second, this conjecture also fails to explain why present in a complement clause although *rejected* 31,25% of the time under the DA condition, is nonetheless *accepted* 96% of the time under the purely simultaneous condition – since in both cases, the present is the form used in the direct speech that is reported.

Now, the purely simultaneous, zero-tense, construal of present under past, though illicit in SOT languages such as French, is licit in non-SOT languages like Japanese. We conclude that in child French, just like in adult Japanese, but unlike in adult French, a zero-tense can surface/be spelled-out as a present, that is, as the default, morphologically unmarked tense form (see our SOT parameter in (16)). We return to this proposal, fleshing out its implications for the (cross-linguistic) acquisition of SOT, in the concluding section of this paper. However, it is worth emphasizing at this point, and as will become clear from our discussion in section 8 below, that our claim is not that French children have a non-adult/Japanese setting for the SOT parameter (since they allow zero-tense construals of the present in embedded contexts) – but rather that they have a *multivalued* setting for the SOT parameter since they accept both the present and the *imparfait* (see footnote 7) on a zero-tense construal in subordinate contexts.

6. Indexical Present in French Child Grammar

Recall that, for Ogihara, Japanese has two presents: an indexical present and tenseless/zero-present. We contend that French children, just like Japanese adults, have both a tenseless present and an indexical present in their lexicon. The purely simultaneous construals of present under past discussed in the preceding section provide compelling evidence for a zero-present. That French children also have an indexical present (alongside an indexical past) in their lexicon is the null hypothesis, on the assumption that these children have acquired tense. Since our subjects are 5 to 7 year old children and children at this age have acquired tense,[11] this is the null assumption. Note, moreover, that the spontaneous production data volunteered during the elicitation attests that they use tense morphology appropriately. For instance, they always use the correct present/past tense forms to respond to the two control questions, asked in order to verify that they have followed the sequence of events acted out under the purely simultaneous condition for relative clauses (see (17a-b) above), as illustrated in (25a-c). (25d-e) illustrate spontaneous production of a past perfect (formed with auxiliary 'have' in the *imparfait*) and of a past conditional (formed with the auxiliary *avoir* 'have' in the present conditional), respectively.

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[11] According to Valian (2006), comprehension experiments testing English-speaking children's interpretation of tense focusing on three contrasts—auxiliary *will/did*, copula *is/was*, progressive *is/was*—show that as early as the age of 2, children represent tense syntactically, differentiate present and past tense, and understand the difference between them.

(25) a. Where *are* the cats now?
"Il y en a un qui *est* près de l'arbre, l'autre, il *était* sur la voiture." [Sorenza (5;01)]
'There is one who *is* near the tree, the other, he *was* [be-IMP] on the car.'
b. Where *is* Ann now?
"Elle *lit* le livre d'Harry Potter." [Emma (5;11)]
'She *is* reading [read-PRES] the Harry Potter book.'
c. Where *is* the gray cat now? Where *was* he a moment ago?
"Il *est* derrière la cuisine." "Il *était* sous la table." [Pierre (5;11)]
'He *is* behind the kitcken.' He *was* [be-IMP] under the table.'
d. "Elle l'*avait* pas caressé sur la table, elle l'*avait* caressé par terre." [Samuel (5;09)]
'She *had* [have-IMP] not petted it on the table, she *had* [have-IMP] petted it on the floor."
e. "Non, t'*aurais dû* dire que la petite fille *était* dans le jardin ..." [Laura (5;06)]
'No, you *should* have said that the little girl *was* [be-IMP] in the garden ...'

6.1. The Double Access puzzle

Recall that present under past on the DA condition was accepted 100% of the time in relative clauses, but only 62% of the time in complement clauses. In contrast, there is no asymmetry with the *imparfait* under the DA condition since the *imparfait* was accepted 100% of the time in complement clauses, just like in relative clauses (see footnote 8). So, why do some children reject the present on a DA construal in complement clauses, but never in relative clauses? And, moreover, why do the very same children always accept the *imparfait* in complement clauses under the DA condition? We surmise that the source of this DA puzzle lies in the indexicality of the present in reported attitude contexts. Let's see why.

In the DA context provided in (20), the state described in the complement clause holds for an interval that covers both the time of Pierre's saying (Pierre's 'now') and the speaker's utterance-time (Koko's 'now'). We repeat below the relevant part of the protocol.

(26) *Context*: The coins are in the trunk at the time of Pierre's utterance in (26a).
a. Pierre says: «The coins *are* in the trunk.»
b. Koko's report: «Pierre *said* that the coins *are* in the trunk.»
c. Samuel (5;09): 'No! Say only things that are in the story.'

The fact that some children reject Koko's report in (26b) is all the more surprising if, as we have just argued (section 5), they allow, contrary to adults, the simultaneous, zero-tense construal of the present, since a context which makes the DA construal true (e.g. (20)/(26)), also makes the simultaneous construal true. And indeed, a zero-tense, simultaneous construal of the *imparfait* was accepted 100% of the time under the DA condition, as we would expect.

We surmise that what leads a child to reject (26b) is, in fact, the indexical component of the present on its DA simultaneous construal. The idea is that children reject DA construals of the present in reported speech contexts when they take the indexicality of the present to suggest misrepresentation by the speaker of the reported attitude. Abusch (1991: 2) describes DA sentences in a way that captures well what we think is going on when the child rejects the present in (26b):

> In the situation described in (1) [John said that Mary is pregnant], John did not in fact have a belief implying a prediction about the future utterance-time. If the speaker says (1) in the presence of John, John may object that he only believed that Mary was pregnant at his believing time t_1, but not necessarily at the utterance-time t_0. He may ask the speaker not to misrepresent his believed proposition by constraining its time argument to an interval overlapping t_0. John's objection seems defensible: to describe what John actually believed, the speaker should have used **past** [emphasis added] instead of the present tense in the complement.

We take the child's *No!* to Koko's report in (26b) of Pierre's saying in (26a) to mean: Pierre said at the time of his saying that the coins were in the trunk and *nothing else*. Pierre didn't also say that the coins are now/would be now in the trunk. In other words, the child rejects (26b) because he does not judge it to accurately report what Pierre actually said. The use of the present seems to imply that Pierre holds an attitude towards an interval overlapping a time in the *future* from Pierre's perspective — that is, the *now* of the speaker, Koko. But, Pierre didn't make a statement about a time extending into the future from his perspective to include the current time. As Samuel himself puts it when Koko asks him why he judges his report in (26b) infelicitous: 'Say only things that are in the story!'

Now, why do these same children accept the present under the purely simultaneous condition, where the coins are no longer in the trunk at utterance-time? Because the present in this context is not indexical and can only be construed as a zero-tense: Koko merely reports that Pierre said that at the time of his saying, the coins be-∅ in the trunk. So there is no issue of misrepresentation by the speaker of Pierre's attitude. And why do those children who reject the present in the DA context, accept the *imparfait* in this context? Because they construe the *imparfait* as a zero-tense. So again, no issue of misrepresentation by the speaker of Pierre's attitude arises: Koko merely reports that, at the time of his saying, the coins were [be-∅] in the trunk. Finally, why does no child reject the present in a relative clause under the DA condition ((19))? Because there is no attitude report in this case and, therefore, no issue of a content/report mismatch.

We have answered so far two of the questions raised by our experimental findings in section 4.2. Why do children *accept non-adult* purely simultaneous construals of the present under past in both complement and relative clauses? Because they have a zero-present in their lexicon. Why do some children *reject adult* DA simultaneous construals of present under past in attitude report contexts, but not in relative clauses? Because they have an indexical present in their lexicon, alongside a zero-tense spelled out as a present. They reject adult DA construals in reported speech contexts when they take the indexicality of the present to suggest misrepresentation by the speaker of the reported attitude. On this proposal, French children, just like Japanese adults, have both a tenseless present and an indexical present in their grammar.

We now tackle the last issue raised by our experimental study. Why do children reject the non-simultaneous, purely indexical construal of the present available in a relative clause? This result is surprising in two respects. First, it is unexpected on the assumption that these children have an indexical present. Second, why would children consistently reject the present in a relative clause on a purely indexical construal, while accepting it on a DA construal, when both construals involve an indexical present?

7. Non-Simultaneous, purely Indexical Construals of Present in Relative Clauses

Recall that the results for the non-simultaneous construal of the present in a relative clause were strikingly poor: this forward-shifted/purely indexical construal was rejected 84% of the time (see sections (4.1.2) and (4.2) for the experimental design and results, respectively). We suggest here an account for why children reject forward-shifted/pure indexical readings of the present in relatives based on two premises: (i) a scopal account for indexical/independent construals of relative clauses, and (ii) the *Observation of Isomorphism* in the syntax/LF mapping in child language.

Recall from our discussion in section 3.1, that the indexical construal of tense inside a relative clause is a scopally independent construal. On a scopal account of the indexical construal of the present for the test sentence in (22c), repeated below as (27b), the relative clause QRs at LF out of the scope of the matrix past, adjoining to the matrix IP, yielding (27c). After QR, the tense in the relative clause is structurally independent of the matrix past tense and thus interpreted directly in relation to utterance-time.

(27) a. *Context*: A girl is in the garden. Pierre comes, kisses her and then leaves. The girl then starts reading.
b. Pierre kissed the girl that *is* reading.
c. $[_{DP}\ [_{RC}\ [_{IP2}\ \text{PRES reading}\ ]]]_{\mathbf{1}}\ [_{IP1}\ [_{VP}\ \text{PAST kiss}\ t_{\mathbf{1}}\ ]]$

On this scopal account, we can impute the finding that children reject (84% of the time) the pure indexical construal of present in relative clauses to the *Observation of Isomorphism* in the syntax/LF mapping in child language, the claim that children's semantic scope is isomorphic with overt syntactic scope (Musolino/Crain/Thornton 2000, Lidz/Musolino 2006). The generalization is that children show a massive preference for surface scope interpretations in sentences containing a quantified NP and negation. The conclusion put forth is that children assign adult-like scopal interpretations when the relevant adult interpretations correspond to surface scope (isomorphic) construals, but fail to assign adult-like interpretations when the relevant adult interpretations correspond to inverse scope (non-isomorphic) construals. Lidz/Musolino (2006: 37) thus conclude their discussion of children's interpretation of sentences containing a quantified NP and negation:

> In fact, we found the preference for surface scope even in sentences that require inverse scope in the adult grammar, suggesting the mechanisms for inverse scope, whether they are quantifier raising, reconstruction or the use of choice functions, are extremely difficult to access.

The finding that children reject the purely indexical reading of present under past in relative clauses can thus be taken to reflect a strong bias for surface scope, isomorphic, interpretations since the indexical construal of the present requires inverse scope in the adult grammar — that is, reversing the scope of the relativized DP relative to the matrix tense via QR, as illustrated in (27c).[12]

Now, assuming that children consistently resort to surface scope interpretations, what happens if the relativized object DP remains *in-situ* at LF, under the scope of the matrix past? Well, there are two scenarios to consider in turn ((28), (29)).

First, suppose that the object DP remains *in-situ* within the VP at LF and present is semantically interpreted:

(28) $[_{IP1}[_{VP1}$ PAST kiss $[_{DP}[_{IP2}$ PRES reading]]]]
Temporal polarity requirement on PRES ((5)) violated
ULC ((11)) violated on a forward-shifted/purely indexical construal of PRES
ULC satisfied on a DA construal of PRES
→ DA construal false in the context provided for (27b) in (27a)

The resulting LF in (28) violates the temporal polarity requirement of the present: present is an anti-past polarity item and, as such, cannot remain *in-situ* under the scope of the matrix past. What about the ULC? Recall that the ULC is a constraint on the *reference* of embedded tenses: it prohibits the time denoted by the tense of an embedded clause from completely following the time denoted by the tense of the matrix clause. The purely indexical construal of the present is a forward-shifted construal: the time denoted by the indexical present in the relative clause completely follows the past time denoted by the matrix clause (as illustrated with the temporal schemas in (22a)/(21a) above). (28), on a forward-shifted construal of the present, thus violates the ULC.

In order to avoid a violation of the ULC, there are, in principle, two options.

The embedded relativized DP can remain *in-situ* within the VP, as long as the indexical present inside the DP denotes a time that does *not completely follow* the matrix event – that is, if (27b) is assigned a DA construal were the present denotes a time overlapping both the matrix event-time and utterance-time. But this DA construal is unavailable for the test sentence in (27b) since the context provided in (27a) makes it false.

Alternatively, the relativized DP can QR out of the scope of the matrix past. The ULC is then satisfied since it is a constraint on *embedded* tenses. But if children prefer surface scope interpretations, then reversing the scope of the object DP relative to the matrix tense via QR is not an option for the child either.

In other words, there is no way for the child to avoid a violation of the ULC – if present is semantically interpreted.

Children have, however, a further option, unavailable in the adult grammar. They can construe the embedded present in (27b) as a zero-present:

(29) $[_{IP1}[_{VP1}$ PAST$_1$ kiss $[_{DP}[_{IP2}\varnothing_1^{PRES}$ reading]]]
→ Simultaneous construal *false* in the context provided for (27b) in (27a)

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[12] Note that the non-simultaneous construals we tested all involved object relatives. If our proposal is correct, then we expect children to *accept indexical* construals of present in *subject* relatives with a past in the matrix.

(29) yields a purely simultaneous construal for the test sentence in (27b). But then, this construal will be rejected since it is false in the context provided in (27a). Recall that the spontaneous comments volunteered by the children to justify their *no* answers for the purely indexical construal of the present in a relative clause show that they enforce a simultaneous construal of the subordinate present and that this construal is rejected because it is false in the context provided (e.g. 'No, when he kissed her she was in the garden'; see (21d)/(22d)).

Our account of why children reject indexical construals of the present in relative clauses rests on three assumptions. (i) This construal is a scopally independent construal. (ii) Children have a bias for surface scope, isomorphic construals. (iii) Crucially, children have acquired the condition(s) that prohibit(s) an indexical present from appearing in the scope of past in the adult grammar. In particular, we have argued that both the polarity analysis of the present and the ULC correctly rule out the only reading that makes the target sentence true in the context provided — that is, the forward-shifted reading of the relative clause — if the relativized DP remains under the scope of the matrix past. Removing the embedded present from the scope of the matrix past via QR is an option that children access with difficulty since it involves a non-isomorphic syntax/LF mapping.

7.1. Purely indexical *vs*. DA construals of present in relative clauses

We now turn to the last question to be addressed. Why is an indexical construal of the present *accepted* under the DA condition (100% of the time), but *rejected* under the purely indexical condition (84% of the time)? If children have indeed acquired the condition that prohibits an indexical present from appearing in the scope of past in the adult grammar as argued in the preceding section – and, moreover, this condition is the ULC – then the answer is straightforward. The ULC does not force the relativized DP in the configuration in (30) to QR out of the scope of the matrix past. It merely constrains the embedded present to denote an interval that does not completely follow the past matrix time. An *indexical* present is thus licensed in (30), but only under a DA construal. This construal will be accepted under the DA condition (19) but rejected under the pure indexical condition ((21)/(22)).

(30) $[_{IP1}\ [_{VP1}\ \text{PAST}\ [_{DP}\ [_{IP2}\ \text{PRES}\ ]]]]$
ULC satisfied on a DA construal of PRES
ULC violated on a purely indexical construal of PRES

The ULC allows us to draw the relevant distinction between purely indexical *vs*. DA readings of the present because it is a constraint on the *reference* of embedded tenses. The polarity requirement in (5), on the other hand, constrains the *distribution* of an indexical present. It therefore rules out any occurrence of present under the scope of past and, consequently, would force QR of the relativized DP in (30). On the assumption that children have a strong bias for surface scope, isomorphic construals, the polarity analysis of the present thus incorrectly predicts that children should equally reject DA and pure indexical construals of the present in relatives – since both construals require reversing the scope of the object DP relative to the matrix past tense in order to remove PRES from the scope of PAST in (30).

The polarity analysis of the present also predicts, again contrary to fact, that children should consistently reject DA construals of complement clauses. Recall that the *de re* account of the DA reading of present in complement clauses (section 3.1) involves *res* movement of the embedded present. Present moves all the way up to the matrix level in order to satisfy its polarity requirement, as sketched in (10) above. Long movement of the present in (10) reverses the relative scope of present and past. Scope reversal incorrectly predicts that children should strongly reject DA readings of present in complement clauses, just as they reject purely indexical readings of present in relative clauses, since both will involve non-surface, non-isomorphic, scope construals of present relative to past. We thus conclude again that the polarity analysis of the present fails to draw the relevant distinction between DA and purely indexical construals of present under past.

Summarizing. We have suggested an account for why children reject pure indexical construals of the present based on a scopal analysis of tense in relative clauses together with the *Observation of Isomorphism*. That children reject the present in relative clauses on a purely indexical construal, while accepting it on a DA construal follows from the ULC. Since it is a condition on the reference of embedded tenses, the ULC allows present to remain in the scope of past on a DA construal (yielding an isomorphic scope construal), while forcing present to scope over a matrix past on a pure indexical construal (yielding a non-isomorphic scope construal). On this proposal, children know the ULC – that is, the condition prohibiting an indexical present from appearing in the scope of past in the adult grammar.

Before closing, we suggest yet another reason for why children *always* accept the present in a relative clause under the DA condition. It could very well be the case that at least some of the children who accept the present in (31b) under the DA condition, accept it on the zero-tense construal in (31c). Why? Because a context (e.g. (31a)) that makes the DA reading of the present true also makes a simultaneous reading true.

(31) *DA condition. Present in the RC.*

a. There are two birds, one on the floor, the other in a roofless car. Ann gives the bird in the car a piece of bread.
b. Ann fed the bird that *is* in the car
c. $[_{IP1}$ Ann $\textsc{past}_1$ feed $[_{DP}$ the bird that $[_{IP2}\, \varnothing_1^{PRES}$ be in the car]]]

The zero-tense construal in (31c) yields a simultaneous construal of (31b) that will be true in the context provided by (31a) since it is indeed the case that Ann fed the bird while it was in the car – whether the bird is still in the car at the time of utterance of (31b) as is the case under the DA condition, or has already flown away, as is the case under the pure simultaneous condition (20).

Evidence that children allow the zero-tense construal of the embedded tense in (31c) under the DA condition is provided by our results for the *imparfait*, accepted at 100% under this condition:

(32) *DA condition.* IMP *in the RC.*

a. There are two birds, one on the floor, the other in a roofless car. Ann gives the bird in the car a piece of bread.
b. Anne a nourrit l'oiseau qui *était* dans la voiture
'Ann fed the bird that *was* [be-IMP] in the car.'
c. $[_{IP1}$ Ann PAST$_1$ feed $[_{DP}$ the bird that $[_{IP2}\ \varnothing_1^{PAST}$ be in the car]]]

Now, the *imparfait* in (32b) will yield a simultaneous construal of the embedded state (whether or not this state continues to hold at utterance-time) on either the scopally dependent zero-tense analysis in (32c), or on a scopally independent analysis of the relative clause. Under a scopally independent analysis, the relativized DP QRs to the matrix level and the *imparfait* within the relative clause is indexical, expressing anteriority relative to utterance-time. Temporal overlap between the past matrix event and the past embedded state yields the simultaneous construal. However, the scopally independent analysis predicts that children should also allow forward-shifted readings of the *imparfait* in relative clauses – contrary to fact, since the forward shifting was rejected at 77%. The context for testing this forward-shifted reading is illustrated in (33).

(33) *Forward-shifted RC with an* IMP

a. There are two cats. Anne brushes the one on the bed. Later, the cat on the bed jumps into the basket. Then, he sees a bird and runs after it.
b. *Koko*: Anne a brossé le chat qui *était* dans le panier.
'Anne brushed the cat that *was* in the basket.'
c. Non, parce que t'avais dit qu'elle l'avait brossé là [le panier] et elle l'a brossé là [le lit]. [Samuel 5;09]
'No, because you had said that she had brushed it there [the basket] and she brushed it there [the bed].'

That children reject forward-shifted readings of the *imparfait* (enforcing a zero-past construal, as the comment volunteered in (33c) clearly indicates) is not surprising on the proposal defended above, that children reject independent readings of relative clauses because they have a strong preference for surface scope, isomorphic construals.

We conclude that children that accept the *imparfait* under the DA condition (32) analyze it as a zero-past. If a zero-tense analysis is available to them for the *imparfait*, then it should also be available for the present under the DA condition (31) since, unlike adults, children also have a zero-present in their grammar. Then it could very well be the case that (at least some) children accept the present in a relative clause under the DA condition while rejecting it under the purely indexical condition — because the zero-tense construal of the present is true under the DA condition, but false under the purely indexical condition.

The same line of reasoning extends to present in complement clauses, under the DA condition. It could be that some of the children that accept the present under this condition accept it on a zero-present construal. Once again, evidence that the zero-tense analysis must be available to the children under this condition is provided by our results for the *imparfait*: a zero-tense construal of the *imparfait* was accepted at 100% under the DA condition. However, it could just as well be the case that (those or at least some of the) children that accept the present under this condition accept it on indexical construal. The ULC will ensure that the interval denoted by the present in the complement clause also includes the matrix event-time.

We conclude this paper by fleshing out the implications of our findings for the crosslinguistic acquisition of SOT.

8. Conclusion: the SOT Parameter in Child Grammar

In section 1, we discussed the core differences between SOT and non-SOT languages, with respect to the construal of present and past under a matrix past:

(i) *Present* under past allows a simultaneous construal in non-SOT languages, but not in SOT languages where present is always indexical.
(ii) *Past* under past allows a simultaneous construal in SOT languages, but not in non-SOT languages where past under past always expresses temporal anteriority.

We adopted Kratzer's (1998) proposal that simultaneous construals involve base-generated zero-tenses that get bound by the past in the matrix. We then accounted for cross-linguistic variation in the morphological realization of zero-tenses in terms of the following parametric choice for spelling-out zero-tenses:

(34) a. *Non-SOT languages*
The morphological features of a zero-tense are the default/unmarked features.
b. *SOT languages*
The morphological features of a zero-tense are determined via PF-agreement (between the embedded tense and the matrix tense).

On the basis of our experimental investigation of the construal of present under past in child French, we concluded that French children, just like Japanese adults, but unlike French adults, have a zero-present, along side an indexical present, in their lexicon. This means that they have the non-SOT setting for spelling out zero-tenses: present (that is, the default, unmarked morphological tense form) can spell out a zero-tense.

The results of our investigation of the construal of (imperfective) past under past in child French (not reported here, but see Demirdache/Lungu 2008) show, however, that they also have the adult setting for the SOT parameter. In particular, the *imparfait* was accepted under the purely simultaneous condition *100%* of the time in relative clauses such as (35a), and *90%* of the time in complement clauses such as (36a).

(35) *Purely simultaneous condition.* IMP *in the RC.*
There are two birds in this story, one on the floor, the other in a roofless car. Ann gives the bird in the car a piece of bread. The bird then flies away.

a. Anne a donné un morceau de pain à l'oiseau qui *était* dans la voiture.
'Ann gave a piece of bread to the bird that *was* in the car.'
b. Ann PAST_1 give a piece of bread to the bird that $\varnothing_1^{\text{PAST}}$ be the car.

(36) *Purely simultaneous condition.* IMP *in the complement clause.*
Pierre is playing with his coins in the garden. Mummy arrives and says: «Oh, la la! What a mess! Put all your things away!» Pierre puts his coins in the trunk.
Later, his sister, Ann, arrives and look what she does! She empties the trunk. Oh, what a nasty girl! *Now, all the coins are on the grass!*

a. Pierre a dit que les pièces *étaient* dans le coffre.
'Pierre said that the coins *were* in the trunk.'
b. Pierre PAST$_1$ say that the coins $\varnothing_1^{\text{PAST}}$ be in the trunk.

On the zero-tense analysis in (35b)/(36b) of the purely simultaneous construal of (35a)/(36a), the embedded past carries no meaning of anteriority since it has no temporal features at all. Following Kratzer, PF agreement (feature transmission) between the zero-past and its antecedent, the higher past, determines its pronunciation.

We conclude that French children allow the adult/French setting for the SOT parameter (34b) since they can construe the *imparfait* as a zero-tense, as well as the non-adult/Japanese setting for this parameter (34a), since they can also construe the present as a zero-tense.

The assumption that children allow both settings of a parameter is expected on the *Multiple Grammar* approach advocated by Roeper (1999) and Yang (2000), where language acquisition involves grammar competition. Learners consider multiple grammars simultaneously before settling on a single grammar. Deviation of child language from the target language is explained by the presence of default non-target grammars that have not yet been eliminated during language acquisition.[13]

If our proposal is right, then the null assumption would be that Japanese children, just like French children, go through a stage where they also allow the setting of the SOT parameter to be multi-valued — that is, where both present and past can be construed as zero-tenses. The prediction would then be that Japanese kids should allow simultaneous construals of past under past, although in the adult language, past always expresses anteriority and thus only yields shifted readings under a matrix past (see (14)).

There is experimental evidence that this prediction might indeed be correct. Matsuo/Hollebrandse (1999) report data from an SOT experiment testing the construals of past and present in complement clauses, conducted with Japanese children ranging in age between 3;4 and 6;2. The experimental task is a Truth Value Judgment Task, with stories acted out in front of the child. The test items are *yes-no* questions that the child is asked to answer. In the experiment testing the simultaneous construal of past under past, the child must answer a *yes-no* question, such as (37), in a context which makes the simultaneous construal of the past complement clause — unavailable in the adult grammar — true.

(37) Zoo-san-wa kuruma-wa zembu ouchi-no-naka-ni *at-ta* to iimashi-ta-ka
elephant-Mr.TOP cars-TOP all house-GEN-in-LOC exist-PAST that say-PAST-Q
'Did the elephant say that all the cars *were* in the house?'

---

[13] Note that 'Split SOT' languages (e.g. Russian/Romanian) provide evidence that the SOT parameter cannot be a traditional binary-valued parameter with mutually exclusive settings, but rather is a multi-valued parameter where both settings are used for different contexts in the same language.

The results show that Japanese children systematically accept *past* under past on a simultaneous construal of complement clauses: 93% to 100% of *yes* responses were elicited. This suggests that our proposal that children acquiring an SOT language, such as French, go through a stage with competing grammars where both settings of the SOT parameter are switched on might carry over to children acquiring a non-SOT language, such as Japanese.

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